Baba Ghulam Shah Badshah University
Rajouri - 185234 (J&K)

The Dean
Schools of Engineering & Technology
BGSB University
Rajouri

No: BGSBU/Acad/22/229
Dated: 17-10-2022

Sir,

Kindly find attached herewith the comments received from the Academic expert and Industrial expert appointed for the Board of Studies in ***B. Tech. Information Technology and Engineering programme*** which are being sent to you for further necessary action at your end.

Thanking you,

Dr. Manmeet Singh
Coordinator ITE for n.a

BGSBU/SOET/22/714
Date - 18/10/22.

Yours faithfully,

Deputy Registrar
(Academic Affairs)
17/10/2022

17/10/2022

Attachments :- 02

Gmail

Shabina Nazir <shabinanazir.2011@gmail.com>

Document from sagheer ahmed35

Bhanu Pratap Singh Slathia <bhanu@ladybirdweb.com> Mon, Sep 5, 2022 at 9:53 PM
To: Shabina Nazir <shabinanazir.2011@gmail.com>
Cc: iparwez2002 <iparwez2002@gmail.com>

Dear Shabina Nazir,

Hope you are doing well.
Sorry for the late reply.

The program looks very good and is designed well. Which is covering many aspects of IT & technologies. Which gives broad exposure to the students and also can help them pick up one stream in the future for a job/career.

Few suggestions:
In elective courses, more options could be added like below

- Dot Net - Windows technologies
- PHP - Frameworks like Laravel or Symphony. I see basic PHP is covered in some courses which also seems good

It's a very well-designed program overall. I like the idea of covering things beyond technology such as ethics, and human values. These are very important subjects for today's world & the young generation for them to be an active part of the society.

Thank You.
[Quoted text hidden]
--
Please feel free to contact us for further assistance

--
Regards,
Bhanu Pratap Singh Slathia
Founder & CEO, Faveo Helpdesk | M: +91 94191 89781 | Skype: bhanu2217
Facebook | Twitter | Linkedin

Please use this link to schedule a meeting with me at a convenient time https://bhanu-ladybirdweb.zohobookings.com

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Tel : +91 80 4709 2805

Gmail

Shabina Nazir <shabinanazir.2011@gmail.com>

Document from sagheer ahmed35

Director NIT Uttarakhand <director@nituk.ac.in> Mon, Oct 17, 2022 at 8:21 AM
To: Shabina Nazir <shabinanazir.2011@gmail.com>

Dear Nasir,
Tge schem and syllabus has been drafted very carefully however my observations are as follows:
1 we must take care of NEP in this scheme and allow students to take course not only from science, arts but liberal arts also
2 The courses are well taught but there can be better arrangement of contents and few more courses CA be added
3 All the courses must have good books as part of list like
Course on C must have book by Kerrigan and Ritchie
4 The courses like C and C++ may be clubed and a slot can be created for other essential course
5 There must be room for courses to be taken from NPTEL or MOOCS online
6 A better input can be provided in an online meeting if u feel
7 course order may be made better by defining prerequisite courses of a course
8 All courses must have prescribed text books
Best wishes

Lalit K Awasthi
[Quoted text hidden]

DEPARTMENT OF INFORMATION TECHNOLOGY AND ENGINEERING
BABA GHULAM SHAH BADSHAH UNIVERSITY
Rajouri, J&K-185234

Ref. No.: BGSBU/SoET/ITE/22/89 Dated: 21-10-2022

Minutes of Meeting

A meeting was held in the ITE department on 21-10-2022 11 AM in light with the comments made by the Academic and Industrial expert received from the office of Dean academic affairs wide letter no. BGSBU/Acad/22/228 dated 17-10-2022, attended by following members.

1. Dr. Manmeet Singh – Assistant Professor & Coordinator, ITE
2. Mr. Nikhil Gupta – Assistant Professor, ITE
3. Mr. Vishal Sharma– Lecturer, ITE
4. Mr. Rashed Shawl– Lecturer, ITE

The following comments were discussed and resolved as follows.

1. Comments from Academic Experts

Comments	Resolved
we must take care of NEP in this scheme and allow students to take course not only from science, arts but liberal arts also	Since the courses for the first year are common considering the branch change, it was resolved that liberal arts courses will be offered after studying the feasibility in the yearly revision for 2nd and 3rd year
The courses are well taught but there can be better arrangement of contents and few more courses can be added	It was resolved that additional courses will be added as electives in the yearly revision for 2nd and 3rd year courses.
All the courses must have good books as part of list like Course on C must have book by Kerrigan and Ritchie	The C Programming Language-2nd Edition Book by Brian Kernighan and Dennis Ritchie (Prentice Hall Software) be added under text book of the curriculum for course code ESC-ITE-223 titled "C Programming" as proposed.
The courses like C and C++ may be clubed and a slot can be created for other essential course	The teachers expressed the difficulty faced by students especially in programming courses and hence it was resolved that C programming and C++ be offered as separate courses.
There must be room for courses to be taken from NPTEL or MOOCS online	It was resolved that students be encouraged to enroll for NPTEL or MOOCS online courses.
A better input can be provided in an online meeting if u feel	We sincerely thank the Academic expert for his valuable comments.

Email: headite@bgsbu.ac.in web: www.bgsbu.ac.in Mob: 9797658158

DEPARTMENT OF INFORMATION TECHNOLOGY AND ENGINEERING
BABA GHULAM SHAH BADSHAH UNIVERSITY
Rajouri, J&K-185234

Ref. No.: BGSBU/SoET/ITE/22/89 Dated: 21-10-2022

Course order may be made better by defining prerequisite courses of a course	It was resolved that Course prerequisite will be prepared separately and shared with the students.
All courses must have prescribed text books	It was resolved that prescribed text-books be present in all the course curriculum

2. Comments from Industrial Expert

Comments	**Resolved**
In elective courses, more options could be added like below • Dot Net - Windows technologies • PHP- Frameworks like Laravel or Symphony. I see basic PHP is covered in some courses which also seems	During the industrial training, most of the students learn new technologies. It was resolved that students be encouraged to learn technologies like Dot.Net and PHP frameworks like Laravel and symphony.

Dr. Manmeet Singh
Assistant Professor
& Coordinator, ITE

Mr. Nikhil Gupta
Assistant Professor,
ITE

Mr. Vishal Sharma
Lecturer, ITE

Mr. Rashed Shawl
Lecturer, ITE

DEPARTMENT OF INFORMATION TECHNOLOGY AND ENGINEERING
BABA GHULAM SHAH BADSHAH UNIVERSITY
Rajouri, J&K-185234

Ref. No.: BGSBU/SoET/ITE/22/90. Dated: ..21-10-2022..

Deputy Registrar
(Academic Affairs)

Respected Madam,

In reference to the letter no. BGSBU/Acad/22/228 dated 17-10-2022, a meeting with the Academic expert was held in online mode on 20-10-2022 03:30 PM to get further clarity on the observations made by the academic expert. Subsequently, a meeting was held in the department on 21-10-2022 11 AM in light with the comments made by the academic and industrial expert and resolved as follows.

1. Comments from Academic Experts

Comments	**Resolved**
we must take care of NEP in this scheme and allow students to take course not only from science, arts but liberal arts also	Since the courses for the first year are common considering the branch change, it was resolved that liberal arts courses will be offered after studying the feasibility in the yearly revision for 2nd and 3rd year
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DEPARTMENT OF INFORMATION TECHNOLOGY AND ENGINEERING
BABA GHULAM SHAH BADSHAH UNIVERSITY
Rajouri, J&K-185234

Ref. No.: BGSBU/SoET/ITE/22/90 Dated: 31-10-2022

Deputy Registrar
(Academic Affairs)

Respected Madam,

In reference to the letter no. BGSBU/Acad/22/228 dated 17-10-2022, a meeting with the Academic expert was held in online mode on 20-10-2022 03:30 PM to get further clarity on the observations made by the academic expert. Subsequently, a meeting was held in the department on 21-10-2022 11 AM in light with the comments made by the academic and industrial expert and resolved as follows.

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DEPARTMENT OF INFORMATION TECHNOLOGY AND ENGINEERING
BABA GHULAM SHAH BADSHAH UNIVERSITY
Rajouri, J&K-185234

Ref. No.: BGSBU/SoET/ITE/22/90. Dated: 21-10-22

Course order may be made better by defining prerequisite courses of a course	It was resolved that Course prerequisite will be prepared separately and shared with the students.
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Dr. Manmeet Singh
Coordinator, ITE

COLLEGE OF NURSING RAJOURI
School of Nursing & Biomedical Science
Baba Ghulam Shah Badshah University Rajouri UT of Jammu & Kashmir
Established by Government of Jammu & Kashmir
Recognized by UGC under section 2(f) & 12(B)

Ref. No: BGSBU/CONR/22/315

Dated: 06/09/2022

To

The Dean Academic Affairs

BGSB University

Rajouri

Through Proper Channel (OSD Nursing Colleges)

Subject: Submission of Documents following the completion of the II[nd] Board of Studies Meeting Conducted on 26[th] August 2022.

Sir,

With regard to the above-mentioned subject, I am hereby submitting the documents following the II [nd] Board of Studies meeting conducted successfully on 26[th] August 2022. Kindly see the enclosed documents for your reference.

Thanking you,

Yours faithfully,

Dr. Titi Xavier PhD. (N)
(Dr. Titi Xavier) Ph.D. (N)
Associate Dean
Associate Dean
School of Nursing and Biomedical Sciences
School of Nursing & Biomedical Sciences
BGSB University
BGSB, University Rajouri

List of Encl:

01. Copy of INC syllabus (Revised syllabus)
02. Minutes of BOS
03. Agenda
04. List of Annexures (08 Nos)
    - BSc. nursing revised INC syllabus
    - Programme outcome, specific outcome and course outcome
    - Criteria for examiners (Theory and practical)
    - Mode of admission for BSc. nursing programme
    - Internal assessment marks distribution
    - Integration of MLHP
    - Module on Yoga for Nursing Students
    - Health awareness day calendar

BABA GHULAM SHAH BADSHAH UNIVERSITY

School of Nursing and Biomedical Sciences

SYLLABUS AND REGULATIONS FOR B.SC. NURSING

COLLEGE OF NURSING

RAJOURI, J&K-185234

COVER PAGE DESIGN AND EDITING: S MANIKANDAN, ASST PROFESSOR. CONR, BGSB UNIVERSITY.

INDEX

I. PHILOSOPHY

Baba Ghulam Shah Badshah University College of Nursing, Rajouri believes that:

Health and wellness are two fundamental concepts that are integrated throughout the program. Health is a state of well- being that encompasses physical, psychological, social, economic and spiritual dimensions. Wellness is the individual 's perception of wellness and is influenced by the presence of disease and individual 's ability to adapt. Health is a right of all people. Individuals have a right to be active participants in achieving health as they perceive it. Society consists of dynamic and interactive systems involving individuals, families, groups and communities. Cultural diversity, race, caste, creed, socio economic levels, religion, lifestyles, changes in environment and political factors influence it. Nurses and midwives recognize and respect human differences and diversity of population within society and provide ethical care with respect and dignity and protect their rights.

Nursing as a profession and a discipline utilizes knowledge derived from arts, sciences (physical, biological and behavioral), humanities and human experience. Nursing science incorporates clinical competence, critical thinking, communication, teaching learning, professionalism, and caring and cultural competency. Nurses collaborate with other health disciplines to solve individual and community health problems. Nursing facilitates evidence-based practice, compassionate caring among its practitioners in response to emerging issues in healthcare and new discoveries and technologies in profession. Nursing practice requires personal commitment to professional development and life-long learning.

Scope of nursing and midwifery practice encompasses provision of promotive, preventive, curative and rehabilitative aspects of care to people across the life span in a wide variety of healthcare settings. Nursing practice is based on acquisition of knowledge, understanding, attitude, competencies and skills through the Council's curricular and practice standards. The competencies in which the students are trained will guide them in performing their scope of practice. Nursing offers qualified nurses and midwives a wealth of opportunities in the field of practice, education, management and research in India and overseas.

The undergraduate nursing program is broad based education within an academic curricular framework specifically directed to the development of critical thinking skills, competencies appropriate to human and professional values. Blended learning approach comprising of experiential learning, reflective learning, scenario based learning and simulated learning is also inbuilt. The teaching learning process encourages mastery learning, modular, self-directed and self-accountable in choice making in terms of elective courses. The program

prepares its graduates to become exemplary citizens by adhering to code of ethics and professional conduct at all times in fulfilling personal, social and professional obligations so as to respond to national aspirations. Health and community orientation are provided with special emphasis on national health problems, national health programs and national health policy directives to achieve universal health

care for all citizens of India. The main roles of graduates would be provider of care with beginning proficiency in delivering safe care, coordinator/manager of care by being active participant of inter-professional team and member of a profession demonstrating self-responsibility and accountability for practice as well as to support the profession.

The faculty has the responsibility to be role models and create learning environment that facilitates cultivation of critical thinking, curiosity, creativity and inquiry driven self- directed learning and attitude of life-long learning in students. Learners and educators interact in a process whereby students gain competencies required to function within their scope of practice.

II. PROGRAMME OUTCOMES

On the completion of the B.Sc. Nursing program (8-semester) the nursing graduate will be able to:

PO1. Integrate comprehension of nursing standards of excellence within the context of nursing skills and practice.

PO2. Recognize the need for the advancement of professional practice through contributions to education, administration, health care policy, and knowledge development.

PO3. Demonstrate caring, culturally responsive leadership communication

PO4. Effectively lead interdisciplinary healthcare teams by applying knowledge of professional nursing leadership roles in the healthcare system.

PO5. Demonstrate effective communication using principles of disciplined writing.

PO6. Demonstrate cognizant knowledge of inter-professional healthcare leadership roles for quality healthcare outcomes.

PO7. Demonstrate nursing leadership to facilitate interpersonal collaborations, conflict resolution, and team-building in health care systems

PO8. Advocate policy decisions to improve healthcare that is effective, timely, efficient, and equitable for all members of society.

PO9. Demonstrate an understanding of competent ethical principles and values of nursing practice.

PO10. Work with dedication towards advancing a culture of professional excellence and achievement through lifelong learning.

III. AIMS

The aims of the undergraduate program are to:

1. Produce knowledgeable competent nurses and midwives with clear critical thinking skills who are caring, motivated, assertive and well-disciplined responding to the changing needs of profession, healthcare delivery system and society.
2. Prepare them to assume responsibilities as professional, competent nurses and midwives in providing promotive, preventive, curative and rehabilitative healthcare services in any healthcare setting.
3. Prepare nurses and midwives who can make independent decisions in nursing situations within the scope of practice, protect the rights of individuals and groups and conduct research in the areas of nursing practice and apply evidence- based practice.
4. Prepare them to assume role of practitioner, teacher, supervisor and manager in all healthcare settings.

IV. PROGRAMME SPECIFIC OUTCOMES:

On completion of the B.Sc. Nursing program, the B.Sc. nursing graduates will be able to;

PSO1: Utilize critical thinking to synthesize knowledge derived from physical, biological, behavioral sciences, and humanities, in the practice of professional nursing and midwifery.

PSO2: Practice professional nursing and midwifery competently and safely in diverse settings, utilizing caring, critical thinking and therapeutic nursing interventions with individuals, families, populations and communities at any developmental stage and with varied lived health experiences.

PSO3: Provide promotive, preventive and restorative health services in line with national health policies and programs.

PSO4: Integrate professional caring into practice decisions that encompass values, ethical, and moral and legal aspects of nursing.

PSO5: Respect the dignity, worth, and uniqueness of self and others.

PSO6: Apply concepts of leadership, autonomy and management to the practice of nursing and midwifery to enhance quality and safety in health care.

PSO7: Utilize the latest knowledge and skills related to information and technology to enhance patient outcomes.

PSO8: Communicate effectively with patients, peers, and all health care providers.

PSO9: Utilize the requisite knowledge, skills and technologies to practice independently and

collaboratively with all health professionals applying the principles of safety and quality improvement.

PSO10: Integrate research findings and nursing theory in decision making in evidence-based practice.

PSO11: Accept responsibility and accountability for the effectiveness of one‘s own nursing and midwifery practice and professional growth as a learner, clinician and leader.

PSO12: Participate in the advancement of the profession to improve health care for the betterment of the global society.

ADMISSION TERMS AND CONDITIONS

1. The minimum age for admission shall be 17 years on 31st December of the year in which admission is sought. The maximum age limit for admission shall be 35 years.

2. Minimum Educational Qualification

   a) Candidate with Science who have passed the qualifying 12th Standard examination (10+2) and must have obtained a minimum of 45% marks in Physics, Chemistry and Biology taken together and passed in English individually.

   b) Candidates are also eligible from State Open School recognized by State Government and National Institute of Open School (NIOS) recognized by Central Government having Science subjects and English only.

   c) English is a compulsory subject in 10+2 for being eligible for admission to B.Sc. (Nursing).

3. Colour blind candidates are eligible provided that Colour corrective contact lens and spectacles are worn by such candidates.

4. Candidate shall be medically fit.

5. Married candidates are also eligible for admission.

6. Students shall be admitted once in a year.

7. Selection of candidates should be based on the merit of the entrance examination. Entrance test** shall comprise of:

a)	**Aptitude for Nursing**	**20 marks**
b)	**Physics**	**20 marks**
c)	**Chemistry**	**20 marks**
d)	**Biology**	**20 marks**
e)	**English**	**20 marks**

MINIMUM QUALIFYING CRITERIA OF ENRANCE TEST FOR ADMISSION TO BSC (N)		
A.	**GENERAL**	**50TH PERCENTILE**
B.	**SC/ST/OBC**	**40TH PERCENTILE**
C.	**GENRAL -PWD**	**45TH PERCENTILE**
D.	**SC/ST/OBC-PWD**	**40TH PERCENTILE**

**Entrance test shall be conducted by University/State Government.

. Reservation Policy

• **Reservation of seats in for admission in Nursing Colleges for SC/ST/OBC/EWSs/PH**

Admission under the reserved quota shall be subject to reservation policy and eligibility criteria for SC/ST/OBC/EWSs prescribed by the Central Govt./State Govt./Union Territory as applicable to the College concerned.

In respect of candidates belonging to SC/ST/OBC the marks obtained in 3 subjects Physics, Chemistry, Biology shall be 40% and passed in English individually.

• **Reservation for disability**

5% Disability reservation to be considered for disabled candidates with a **disability of loco-motor** to the tune of 40% to 50% of the lower extremity and other eligibility criteria with regard to qualification will be same as prescribed for General category candidates. The upper age limit shall be relaxed by 5 years for disabled candidates.

Note: *A committee to be formed consisting of medical officer authorized by medical board of State government and a nursing expert in the panel which may decide whether the candidates have the disability of loco-motor to the tune of 40% to 50%.*

Note:

i. Reservations shall be applicable within the sanctioned number of the seats.

ii. The start of the semester shall be 1st August every year.

iii. No admission after the cut-off date i.e. 30th September will be undertaken. Further Hall Tickets/Admit Card shall not be issued to the candidates who are admitted after 30th September.

iv. The responsibility of obtaining and verifying the requisite documents for admission lies with the Institution and University.

9. Foreign Nationals:

The entry qualification equivalency i.e., 12th standard will be obtained by Association of Indian Universities, New

Delhi. Institution, SNRC and University will be responsible to ensure that the qualification and eligibility will be

equivalent to what has been prescribed by the Council.

10. Admission/Selection Committee

This committee should comprise of:

- Principal (Chairperson)
- Vice-Principal
- Professor
- Chief Nursing Officer or Nursing Superintendent

11. Admission Strength

Maximum intake of students shall be sixty if the institution has a 100 bedded unitary parent hospital and 61-100 if the

institution has 300 or more bedded unitary parent hospital.

12. Health Services

There should be provisions for the following health services for the students.

CURRICULUM

CURRICULAR FRAMEWORK

The B.Sc. Nursing program is a four-year program comprising of eight semesters that is credit and semester based. It is choice based only for elective courses. Competency based curriculum is the main approach that is based on ten core competencies. The courses are categorized into foundational courses, core courses and elective courses. The curricular framework shown in Figure 2 depicts the entire course of curriculum, which is further outlined in the program structure.

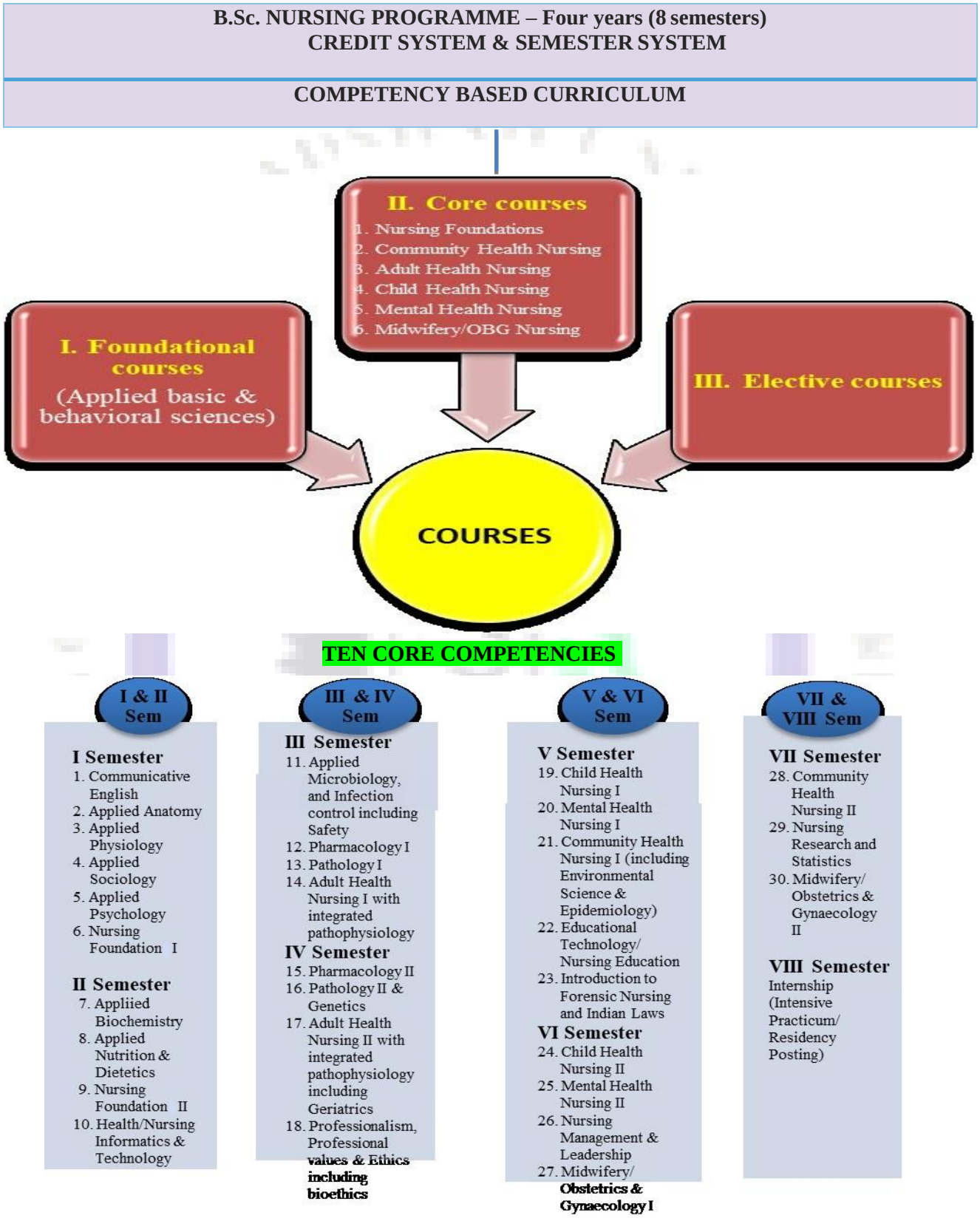

FIGURE 01: CURRICULAR FRAMEWORK

1. PROGRAM STRUCTURE

B.Sc. Nursing Program Structure			
I Semester 1. Communicative English 2. Applied Anatomy 3. Applied Physiology 4. Applied Sociology 5. Applied Psychology 6. *Nursing Foundation I ***Mandatory Module*** *First Aid as part of Nursing Foundation I Course	**III Semester** 1. Applied Microbiology and Infection Control including Safety 2. Pharmacology I 3. Pathology I 4. *Adult Health (Medical Surgical) Nursing I with integrated pathophysiology ***Mandatory Module*** *BCLS as part of Adult Health Nursing I	**V Semester** 1. *Child Health Nursing I 2. Mental Health Nursing I 3. Community Health Nursing I (including Environmental Science & Epidemiology) 4. Educational Technology/Nursing Education 5. Introduction to Forensic Nursing and Indian Laws ***Mandatory Modules*** *Essential Newborn Care (ENBC), Facility Based Newborn Care (FBNBC), IMNCI and PLS as part of Child Health Nursing	**VII Semester** 1. Community Health Nursing II 2. Nursing Research & Statistics 3. Midwifery/Obstetrics and Gynecology (OBG) Nursing II ***Mandatory Modules*** *Safe delivery app under OBG Nursing I/II (VI/VII Semester)

II Semester	**IV Semester**	**VI Semester**	**VIII Semester**
1. Applied Biochemistry 2. Applied Nutrition and Dietetics 3. *Nursing Foundation II 4. Health/Nursing Informatics & Technology ***Mandatory Module*** *Health Assessment as of Nursing Foundation II Course	1. *Pharmacology II 2. Pathology II & Genetics 3. Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing 4. Professionalism, Professional Values & Ethics including Bioethics ***Mandatory Module*** *Fundamentals of Prescribing under Pharmacology II *Palliative care module under Adult Health Nursing II	1. Child Health Nursing II 2. Mental Health Nursing II 3. Nursing Management & Leadership 4. *Midwifery/Obstetrics and Gynecology (OBG) Nursing I ***Mandatory Module*** * SBA Module under OBG Nursing I/II (VI/VII Semester)	Internship (Intensive Practicum/Residency Posting)

Note: No institute/University will modify the curriculum. However, they can add units/subject in the syllabus as deemed necessary.

#**Modules both mandatory and elective shall be certified by the institution/external agency**

MANDATORY MODULES

The prepared modules/modules outlined by the Council such as Health Assessment & Fundamentals of Prescribing and available modules as National Guidelines (First Aid – NDMA, IMNCI, ENBC, FBNBC), Palliative Care, Safe Delivery App and SBA module will be provided in separate learning resource package.

For BCLS, PLS – Standard national/international modules can be used. The mandatory modules are offered during the time allotted for respective courses in the course content as theory and practicum-Lab/Clinical.

ELECTIVE MODULES

Number of electives to be completed: 3 (Every module = 1 credit = 20 hours)

III & IV Semesters: To complete any **one** elective by end of 4^{th} semester across 1^{st} to 4^{th} semesters

- Human values
- Diabetes care
- Soft skills

V & VI Semesters: To complete any **one** of the following before end of 6^{th} semester

- CBT
- Personality development
- Addiction psychiatry
- Adolescent health
- Sports health
- Accreditation and practice standards
- Developmental psychology
- Menopausal health
- Health Economics

VII & VIII Semesters: To complete any **one** of the following before end of 8^{th} semester

- Scientific writing skills
- Lactation management
- Sexuality & Health
- Stress management
- Job readiness and employability in health care setting

2. CURRICULUM IMPLEMENTATION OVERALLL PLAN

Duration

Duration of the course shall be 8 semesters

Vacation

3 weeks

1-7 Semesters

[One Semester Plan for the first 7 Semesters]

a. Total Weeks per Semester: 26 weeks per semester

b. Number of Weeks per Semester for instruction: 20 weeks (40 hours per week × 20 weeks = 800 hours)
Number of Working Days: Minimum of 100 working days (5 days per week × 20 weeks)

c. Vacation, Holidays, Examination and Preparatory Holidays: 6 weeks

Holidays:

1 week

Examination and Preparatory Holidays:

2 weeks

8th Semester

a. One semester: 22 weeks

b. Vacation: 1week

c. Holidays: 1week

d. Examination and Preparatory Holidays = 2 weeks

3. COURSES OF INSTRUCTION WITH CREDIT STRUCTURE

S. No	Semester	Course Code	Course/Subject Title	Theory credits	Theory Contact hours	Lab / Skill Lab credits	Lab/ Skill Lab Contact hours	Clinical credits	Clinical Contact hours	Total credits	Total (hours)
1	**First**	ENGL 101	Communicative English	2	40						40
		ANAT 105	Applied Anatomy	3	60						60
		PHYS 110	Applied Physiology	3	60						60
		SOCI 115	Applied Sociology	3	60						60
		PSYC 120	Applied Psychology	3	60						60
		N-NF (I) 125	Nursing Foundation I including First Aid module	6	120	2	80	2	160	10	360
		SSCC (I) 130	Self-study/Co-curricular								40+40
			TOTAL	**20**	**400**	**2**	**80**	**2**	**160**	**20+2+2= 24**	**640+80**
2	**Second**	BIOC 135	Applied Biochemistry	2	40				40		
		NUTR 140	Applied Nutrition and Dietetics	3	60				60		
		N-NF (II) 125	Nursing Foundation II including Health Assessment module	6	120	3	120	4	320		560
		HNIT 145	Health/Nursing Informatics & Technology	2	40	1	40		80		
		SSCC(II) 130	Self-study/Co-curricular						40+20		
			TOTAL	**13**	**260**	**4**	**160**	**4**	**320**	**13+4+4=21**	**740+60**
3	**Third**	MICR 201	Applied Microbiology and Infection Control including Safety	2	40	1	40		80		
		PHAR (I) 205	Pharmacology I	1	20				20		
		PATH (I) 210	Pathology I	1	20				20		

		N-AHN(I)215	Adult Health Nursing I with integrated pathophysiology including BCLS module	7	140	1	40	6	480		660
		SSCC (I) 220	Self-study/Co-curricular						20		
			TOTAL	**11**	**220**	**2**	**80**	**6**	**480**	**11+2+6=19**	**780+20=800**
4	**Fourth**	PHAR (II) 205	Pharmacology II including Fundamentals of prescribing module	3	60				60		
		PATH (II) 210	Pathology II and Genetics	1	20				20		
		N-AHN (II) 225	Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing + Palliative care module	7	140	1	40	6	480		660
		PROF 230	Professionalism, Professional Values and Ethics including bioethics	1	20						20
		SSCC(II) 220	Self-study/Co-curricular								40
			TOTAL	**12**	**240**	**1**	**40**	**6**	**480**	**12+1+6=19**	**760+40**
5	**Fifth**	N-CHN(I) 301	Child Health Nursing I including Essential Newborn Care (ENBC), FBNC, IMNCI and PLS, modules	3	60	1	40	2	160		260
		N-MHN(I) 305	Mental Health Nursing I	3	60			1	80		140
		N-COMH(I) 310	Community Health Nursing I including Environmental Science & Epidemiology	5	100			2	160		260
		EDUC 315	Educational Technology/ Nursing Education	2	40	1	40	80			
		N-FORN 320	Introduction to Forensic Nursing and Indian laws	1	20		20				

		SSCC(I) 325	Self-study/Co-curricular		20+20						
			TOTAL	**14**	**280**	**2**	**80**	**5**	**400**	**14+2+ 5=21**	**760+40**
6	**Sixth**	N-CHN(II) 301	Child Health Nursing II	2	40	1	80				
		N-MHN(II) 305	Mental Health Nursing II	2	40	2	160				
		NMLE 330	Nursing Management & Leadership	3	60	1	80				
		N-MIDW(I) / OBGN 335	Midwifery/Obstetrics and Gynecology (OBG) Nursing I including SBA module	3	60	1	40	3	240		340
		SSCC(II) 325	Self-study/Co-curricular								
			TOTAL	**10**	**200**	**1**	**40**	**7**	**560**	**10+1+ 7=18**	**800**
7	**Seventh**	N-COMH(II) 401	Community Health Nursing II	5	100	2	160		260		
		NRST 405	Nursing Research & Statistics	2	40	2	80 (Project-40)	120			
		N-MIDW(II) / OBGN 410	Midwifery/Obstetrics and Gynecology (OBG) Nursing II including Safe delivery app module	3	60	1	40	4	320		420
			Self-study/Co-curricular	-------							
			TOTAL	10	200	3	120	6	480	**10+3+ 6=19**	**800**
8	**Eight (Internship)**	INTE 415	Community Health Nursing – 4 weeks								
		INTE 420	Adult Health Nursing – 6 weeks								
		INTE425	Child Health Nursing – 4 weeks								
		INTE 430	Mental Health Nursing – 4 weeks								

		INTE 435	Midwifery – 4 weeks								
			TOTAL = 22 weeks	**12** (1 credit= 4hours per week per semester)							1056 {4hours ×22weeks = 88 hours ×12credits =1056hours} (48hoursperweek× 22weeks)

- 1 credit theory – 1 hour per week per semester
- 1 credit practical/lab/skill lab/simulation lab – 2 hours per week per semester
- 1 credit clinical – 4 hours per week per semester
- 1 credit elective course – 1 hour per week per semester(Electives can be offered during delf-study hours as shown in the following tables)
- Total Semesters = 8
- (**Seven semesters:** One semester = 20 weeks × 40 hours per week = 800 hours)
- (**Eighth semester – Internship:** One semester = 22 weeks × 48 hours per week = 1056 hours)
- Total number of course credits including internship and electives – 156 (141+12+3)

Distribution of credits and hours by courses, internship and electives

S.No.	Credits	Theory (Cr/Hrs)	Lab (Cr/Hrs)	Clinical (Cr/Hrs)	Total credits	Hours
1	Course credits	90 credit per 1800 hours	15/600	36/2880	141	5280
2	Internship				12	1056
3	Electives				3	60
	TOTAL				156	6396
4	Self-study and Co-curricular	Saturdays (one semester = 5 hours per week × 20 weeks × 7 semesters = 700 hours)			12 35	240 700

Distribution of credits, hours and percentage for theory and practicum (Skill Lab & Clinical) across eight semesters

S.No.	Theory & Practicum (Skill Lab & Clinical)	Credits	Hours	Percentage
1	Theory	90	1800	28
2	Lab/Skill Lab	15	600	10
3	Clinical	36	3936	62
	Total	**141**	**6336 hours**	**100**

Practicum (7 semesters) excluding internship

Lab/skill lab/simulation lab – 600 (17%)

Clinical – 2880 (83%)

Total – 3480

Lab/skill lab/simulation lab = 17% of the total practicum planned

Note: Besides the stipulated lab and clinical hours, a maximum of 13% (400-450 hours) from the clinical hours can be used in simulation lab/skill lab for skill lab/simulation learning and not to exceed 30% of total hours.

4. SCHEME OF EXAMINATION

I SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for First Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal Assessment	End Semester College Exam	End Semester University Exam	Hours	Total Marks
	Theory					
01	Communicative English	25	25		2	50
02	Applied Anatomy & Applied Physiology	25		75	3	100
03	Applied Sociology & Applied Psychology	25		75	3	100
04	Nursing Foundation I	25**				
	Practical					
05	Nursing Foundation I*	25**				

*** Practical**

**** Nursing Foundation I Theory and practical Internal marks in Ist semester will be added to Nursing Foundation II Theory and practical Internal in the IInd semester and average of the two semesters will be taken. (Total weightage remains the same).**

Note: All practical examinations must be held in the respective clinical areas. One internal and one external examiner should jointly conduct the practical/clinical examination for each student.

II SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Second Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal Assessment	End Semester College Exam	End Semester University Exam	Hours	Total Marks
	Theory					
01	Applied Biochemistry and Applied Nutrition & Dietetics	25		75	3	100
02	Nursing Foundation (I & II)	25 I Sem-25 & II Sem-25 (with average of both)		75	3	100
03	Health/Nursing Informatics & Technology	25	25		2	50
	Practical					
04	Nursing Foundation (I & II)*	50 I Sem-25 & II Sem-25		50		100

*** Practical**

III SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Third Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Applied Microbiology and Infection Control including Safety	25		75	3	100
02	Pharmacology I and Pathology I	25**				
03	Adult Health Nursing I	25		75	3	100
	Practical					
04	Adult Health Nursing I*	50		50		100

***Practical**

****Will be added to the internal marks of Pharmacology II and Pathology II & Genetics in the next semester (Total weightage remains the same).**

IV SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fourth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Pharmacology & Pathology (I & II) and Genetics	25 III Sem-25 & IV Sem-25 (with average of both)		75	3	100
02	Adult Health Nursing II	25		75	3	100
03	Professionalism, Ethics and Professional Values	25	25		2	50
	Practical					
04	Adult Health Nursing II*	50		50		100

***Practical**

V SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Child Health Nursing I	25**				
02	Mental Health Nursing I	25**				
03	Community Health Nursing I including Environmental Science & Epidemiology	25		75	3	100
04	Educational Technology/Nursing Education	25		75	3	100
05	Introduction to Forensic Nursing and Indian Laws	25	25		2	50
	Practical					
06	Child Health Nursing I*	25**				
07	Mental Health Nursing I*	25**				
08	Community Health Nursing I*	50		50		100

***Practical**

****Will be added to the internal marks of Child Health Nursing II and Mental Health Nursing II in both theory and practical respectively in the next semester (Total weightage remains same).**

VI SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Sixth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Child Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average of both)		75	3	100
02	Mental Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average of both)		75	3	100
03	Nursing Management & Leadership	25		75	3	100
04	Midwifery/Obstetrics & Gynecology I	25**				
	Practical					
05	Child Health Nursing (I & II)*	50 (Sem V-25 & Sem VI-25)		50		100
06	Mental Health Nursing (I & II)*	50 (Sem V-25 & Sem VI-25)		50		100
07	Midwifery/Obstetrics & Gynecology I*	25**				

***Practical**

****Will be added to Internal marks of Midwifery II theory and practical respectively in the next semester (Total weightage remains the same**

VII SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Community Health Nursing II	25		75	3	100
02	Nursing Research & Statistics	25		75	3	100
03	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)	25 Sem VI-25 & Sem VII-25 (with average of both)		75	3	100
	Practical					
04	Community Health Nursing II*	50		50		100
05	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)*	50 (Sem VI-25 & Sem VII-25)		50		100

***Practical**

VIII SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total marks
	Practical					
	Competency Assessment	100		100		200

5. EXAMINATION REGULATIONS

[Note:]

1. Applied Anatomy and Applied Physiology: Question paper will consist of Section-A Applied Anatomy of 37 marks and Section-B Applied Physiology of 38 marks.
2. Applied Sociology and Applied Psychology: Question paper will consist of Section-A Applied Sociology of 37 marks and Section-B Applied Psychology of 38 marks.
3. Applied Microbiology and Infection Control including Safety: Question paper will consist of Section-A Applied Microbiology of 37 marks and Section-B Infection Control including Safety of 38 marks.
4. Applied Biochemistry and Applied Nutrition and Dietetics: Question paper will consist of Section-A Applied Biochemistry with 25 marks and Section-B Applied Nutrition and Dietetics with 50 marks.
5. Pharmacology, Genetics and Pathology: Question paper will consist of Section-A of Pharmacology with 38 marks, Section-B of Pathology with 25 marks and Genetics with 12 marks.
6. Nursing Research and Statistics: Nursing Research should be of 55 marks and Statistics of 20 marks.
7. A candidate must have minimum of 80% attendance (irrespective of the kind of absence) in theory and practical in each course/subject for appearing for examination.
8. A candidate must have 100% attendance in each of the practical areas before award of degree.
9. Following exams shall be conducted as College exams. The minimum pass is 50% except for communicative English. The marks for all the college exams listed below alongside all other university exams must be sent to university for inclusion in the mark sheet and shall be considered for calculating aggregate and ranking for awards by university
    i. Communicative English
    ii. Health/Nursing Informatics and Technology
    iii. Professionalism, Professional Values and Ethics including Bioethics
    iv. Introduction to Forensic Nursing & Indian Laws

    [Award of rank will not be considered for those who fail in one or more courses and must have completed the program by 4 years. The mark sheet with grades and grade point average shall be given by the University for all courses].

    [Communicative English and Elective Modules are not included for calculating Semester Grade Point Average (SGPA)].
10. Minimum pass mark shall be 40% for Communicative English and in each of the Elective module. All Electives modules must be completed as indicated in specified semester and pass

marks sent to university before appearing for final examination.

11. Minimum pass marks shall be 50% in each of the Theory and practical papers separately except in English.

12. The student has to pass in all mandatory modules placed within courses and the pass mark for each module is 50%

13. A candidate has to pass in theory and practical exam separately in each of the paper.

14. If a candidate fails in either theory or practical, he/she has to re-appear for both the papers (Theory and Practical).

15. If the student has failed in only one subject and has passed in all the other subjects of a particular semester and Grace marks of up to 5 marks to theory marks can be added for one course/subject only, provided that by such an addition the student passes the semester examination.

16. The candidate shall appear for exams in each semester:

    i. The candidate shall have cleared all the previous examinations before appearing for fifth semester examination. However, the candidates shall be permitted to attend the consecutive semesters.

    ii. The candidate shall have cleared all the previous examinations before appearing for seventh semester examination. However, the candidates shall be permitted to attend the consecutive semesters.

    iii. The candidate shall have cleared all the previous examination before appearing for final year examination.

    iv. The maximum period to complete the course successfully should not exceed 8 years.

17. The candidate has to pass separately in internal and external examination (shall be reflected in the marks sheet). No institution shall submit average internal marks of the students not more than 75% (i.e. if 40 students are admitted in a course the average score of the 40 students shall not exceed 75% of total internal marks).

18. At least 50% of the Non-nursing subjects like Applied Anatomy & Physiology, Applied Biochemistry, Applied Psychology & Sociology, Applied Microbiology, Pharmacology, Genetics, Nutrition & Dietetics, Communicative English and Health/Nursing Informatics & Technology should be taught by the Nursing teachers. Teachers who are involved in teaching non-nursing subjects can be the examiners for the program.

19. Maximum number of candidates for practical examination should not exceed 20 per day. Particular year and of same institution batch shall be examined by the same set of examiners.

20. All practical examinations must be held in the respective clinical areas.

21. One internal and one external examiner should jointly conduct practical examination for each

student.

22. An examiner for theory and practical/OSCE examination should be an Assistant Professor or above in a College of Nursing with M.Sc. (Nursing) in concerned subject and minimum 3 years of teaching experience. To be an examiner for Nursing Foundations course, the faculty having M.Sc. (Nursing) with any specialty shall be considered.

23. Examiner for Competency Assessment – VIII Semester: There must be a total of five examiners, one from each specialty i.e. External examiners – 2 and Internal examiners – 3. The internal examiners may be from the college faculty or from hospital with the required qualification and experience i.e. M.Sc. (Nursing) in respective specialty with minimum three years of teaching experience.

6. ASSESSMENT GUIDELINES

1. Grading of Performance

Based on the performance, each student shall be awarded a final grade at the end of the semester for each course.

Absolute grading is used by converting the marks to grade, based on predetermined class intervals. UGC 10-point grading system is used with pass grade modified.

Letter grade	Grade point	Percentage of marks
O (Outstanding)	10	100%
A+ (Excellent)	9	90-99.99%
A (Very Good)	8	80-89.99%
B+ (Good)	7	70-79.99%
B (Above Average)	6	60-69.99%
C (Average)	5	50-59.99%
P (Pass)	4	40-49.99%
F (Fail)	0	<50%
Ab(Absent)	0	0
*Pass for Communicative English and Electives – 40% and above. Grade point 4 (40-49.99%)		

For Nursing Courses and all other courses – Pass is at C Grade (5 grade point)

50% and above For English and electives – Pass is at P Grade (4 grade point)

40% and above

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

SPGA is the weighted average of the grade points obtained in all courses by the student during the semester (All courses excluding English and electives)

Ex. SGPA Computation

Course Number	Credit/s	Letter grade	Grade point	Credit point (Credit × grade)
1	3 (C1)	A	8 (G1)	3 × 8 = 24
2	4 (C2)	B+	7 (G2)	4 × 7 = 28
3	3 (C3)	B	6 (G3)	3 × 6 = 18

$$\mathbf{SGPA} = \frac{C1G1 + C2G2 + C3G3}{C1 + C2 + C3}$$

$$= \frac{70}{10} = 7 \text{ (rounded off to two decimal points)}$$

Computation of CGPA

CGPA is calculated with SGPA of all semesters to two decimal points and is indicated in final grade in mark card/transcript showing grades of all 8 semesters and their courses/subjects.

CGPA reflects the failed status in case of fail till the course/s are passed.

Semester I	**Semester 2**	**Semester 3**	**Semester 4**
Credit – Cr Cr: 20	Cr: 22	Cr: 25	Cr: 26
SGPA: 6.5	SGPA: 7.0	SGPA: 5.5	SGPA: 6.0
Cr × SGPA = 20 × 6.5			

$$\textbf{CGPA} = \frac{20 \times 6.5 + 22 \times 7 + 25 \times 5.5 + 26 \times 6}{93}$$

$$= \frac{577.5}{93} = 6.2$$

Transcript Format

Based on the above recommendation on letter grades, grade points, SPGA and CGPA, the transcript shall be issued for each semester with a consolidated transcript indicating the performance in all semesters.

Declaration of Pass

First Class with Distinction – CGPA of 7.5

and above First Class – CGPA of 6.00-7.49

Second Class – CGPA of 5.00-5.99

2. Internal Assessment and Guidelines

The marks distribution of internal assessment is shown in Appendix 1 and the specific guidelines in Appendix 2.

3. University Theory and Practical Examination Pattern

The theory question paper pattern and practical exam pattern are shown in Appendix 3.

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SYLLABUS

IST SEMESTER

B.Sc. NURSING

COMMUNICATIVE ENGLISH

PLACEMENT: I SEMESTER

TIME-THEORY: 2 Credits (40 hours)

COURSE CODE: ENGL 101

COURSE DESCRIPTION: The course is designed to enable students to enhance their ability to speak and write the language (and use English) required for effective communication in their professional work. Students will practice their skills in verbal and written English during clinical and classroom experience.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the significance of Communicative English for healthcare professionals.
2. Apply the concepts and principles of English Language use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, Spelling, pause and silence.
3. Demonstrate attentive listening in different hypothetical situations.
4. Converse effectively, appropriately and timely within the given context and the individual or team they are communicating with either face to face or by other means.
5. Apply LSRW (Listening, Speaking, Reading and Writing) Skill in combination to learn, teach, educate and share information, ideas and results

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	3 (T)	Identify the significance of communicative English	**Communication** • What is communication? • What are communication roles of listeners, speakers, readers and writers as healthcare professionals?	• Definitions with examples, illustrations and explanations • Identifying competencies/ communicative strategies in LSRW • Reading excerpts on the above and interpreting them through tasks	• Checking for understanding through tasks

II	5 (T)	Describe concepts and principles of Language (English) use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, spelling, pause and silence	**Introduction to LSRGW** • L – Listening: Different types of listening • S – Speaking: Understanding Consonants, Vowels, Word and Sentence Stress, Intonation • R – Reading: Medical vocabulary, • Gr – Grammar: Understanding tenses, linkers • W – Writing simple sentences and short paragraphs – emphasis on correct grammar	• Exercises on listening to news, announcements, telephone conversations and instructions from others • Information on fundamentals of Speech – Consonant, Vowel, Stress and Intonation with tasks based on these through audio/video and texts • Reading a medical dictionary/ glossary of medical terms with matching exercises	• Thorough check your understanding 'exercises
III	5 (T)	Demonstrate attentive listening in different hypothetical situations	**Attentive Listening** • Focusing on listening in different situations – announcements, descriptions, narratives, instructions, discussions, demonstrations • Reproducing Verbatim • Listening to academic talks/ lectures • Listening to presentation	• Listening to announcements, news, documentaries with tasks based on listening • With multiple choice, Yes/No and fill in the blank activities	• Checking individually against correct answers • Listening for specific information • Listening for overall meaning and instructions • Listening to attitudes and opinions • Listening to audio, video and identify key points

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
IV	9 (T)	Converse effectively, appropriately and timely within the given context and the individual or team they are communicating with either face to face or other means	**Speaking – Effective Conversation** • Conversation situations – informal, formal and neutral • Factors influencing way of speaking – setting, topic, social relationship, attitude and language • Greetings, introductions, requesting, asking for and giving permission, speaking personally and casual conversations • Asking for information, giving instructions and directions • Agreeing and disagreeing, giving opinions • Describing people, places, events and things, narrating, reporting & reaching conclusions • Evaluating and comparing • Complaints and suggestions • Telephone conversations • Delivering presentations	• Different types of speaking activities related to the content • Guided with prompts and free discussions • Presentation techniques • Talking to peers and other adults. • Talking to patients and Patient attenders • Talking to other healthcare professionals • Classroom conversation • Scenario based learning tasks	• Individual and group/peer assessment through live speaking tests • Presentation of situation in emergency and routine • Handoff • Reporting in doctors/nurses' rounds • Case presentation • Face to face oral communication • Speaking individually (Nurse to nurse/patient/ doctor) and to others in the group • Telephonic talking

V	5 (T)	Read, interpret and comprehend content in text, flow sheet, framework, figures, tables, reports, anecdotes	• **Reading** • Reading strategies, reading notes and messages • Reading relevant articles and news items • Vocabulary for everyday activities, abbreviations and medical vocabulary • Understanding visuals, graphs, figures and notes on instructions Reading reports and interpreting them • Using idioms and phrases, spotting errors, vocabulary for presentations • Remedial Grammar	• Detailed tasks and exercises on reading for information, inference and evaluation • Vocabulary games and puzzles for medical lexis • Grammar activities	• Reading/ summarizing/ justifying answers orally • Patient document • Doctor ‘s prescription of care • Journal/news reading and interpretation Notes/Reports
VI	5 (T)	Enhance expressions through writing skills	**Writing Skills** • Writing patient history • Note taking • Summarizing • Anecdotal records • Letter writing • Diary/Journal writing • Report writing • Paper writing skills • Abstract writing	• Writing tasks with focus on task fulfilment, coherence and cohesion, appropriate vocabulary and correct grammar • Guided and free tasks • Different kinds of letter writing tasks	• Paper based assessment by the teacher/ trainer against set band descriptors • Presentation of situation • Documentation • Report writing • Paper writing skills • Verbatim reproducing • Letter writing • Resume/CV

VII	8 (T)	Apply LSRW Skill in combination to learn, teach, educate and share information, ideas and results	**LSRW Skills** • Critical thinking strategies for listening and reading • Oral reports, presentations • Writing instructions, letters and reports • Error analysis regarding LSRW	• Valuating different options/multiple answers and interpreting decisions through situational activities • Demonstration – individually and in groups • Group Discussion • Presentation • Role Play • Writing reports	• Consolidated assessment orally and through written tasks/exercises

APPLIED ANATOMY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: ANAT 105

COURSE DESCRIPTION: The course is designed to assists student to recall and further acquire the knowledge of the normal structure of human body, identify alteration in anatomical structure with emphasis on clinical application to practice nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe anatomical terms.
2. Explain the general and microscopic structure of each system of the body.
3. Identify relative positions of the major body organs as well as their general anatomic locations.
4. Explore the effect of alterations in structure.
5. Apply knowledge of anatomic structures to analyze clinical situations and therapeutic applications.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Define the terms relative to the anatomical position Describe the anatomical planes Define and describe the terms used to describe movements	**Introduction to anatomical terms and organization of the human body** • Introduction to anatomical terms relative to position – anterior, ventral, posterior dorsal, superior, inferior, median, lateral, proximal, distal, superficial, deep, prone, supine, palmar and plantar • Anatomical planes (axial/ transverse/ horizontal, sagittal/vertical plane and coronal/frontal/oblique plane) • Movements (flexion, extension, abduction, adduction, medial rotation, lateral rotation, inversion, eversion, supination, pronation, plantar flexion, dorsal flexion and circumduction	• Lecture cum Discussion • Use of models • Video demonstration • Use of microscopic slides • Lecture cum Discussion • Video/Slides	• Quiz • MCQ • Short answer

		Organization of human body and structure of cell, tissues membranes and glands Describe the types of cartilage Compare and contrast the features of skeletal, smooth and cardiac muscle	Cell structure, Cell division Tissue – definition, types, characteristics, classification, location Membrane, glands – classification and structure Identify major surface and bony landmarks in each body region, Organization of human body Hyaline, fibro cartilage, elastic cartilage Features of skeletal, smooth and cardiac muscle Application and implication in nursing	Anatomical Torso	
II	6 (T)	Describe the structure of respiratory system Identify the muscles of respiration and examine their contribution to the mechanism of breathing	**The Respiratory system** • Structure of the organs of respiration • Muscles of respiration • Application and implication in nursing	• Lecture cum Discussion • Models • Video/Slides	• Short answer • Objective type
III	6 (T)	Describe the structure of digestive system	**The Digestive system** • Structure of alimentary canal and accessory organs of digestion • Application and implications in nursing	• Lecture cum Discussion • Video/Slides • Anatomical Torso	• Short answer • Objective type

IV	6 (T)	Describe the structure of circulatory and lymphatic system.	**The Circulatory and Lymphatic system** • Structure of blood components, blood vessels – Arterial and Venous system • Position of heart relative to the associated structures • Chambers of heart, layers of heart • Heart valves, coronary arteries • Nerve and blood supply to heart • Lymphatic tissue • Veins used for IV injections • Application and implication in nursing	• Lecture • Models • Video/Slides	• Short answer • MCQ
V	4 (T)	Identify the major endocrine glands and describe the structure of endocrine Glands	**The Endocrine system** • Structure of Hypothalamus, Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands	• Lecture • Models/charts	• Short answer • Objective type
VI	4 (T)	Describe the structure of various sensory organs	**The Sensory organs** • Structure of skin, eye, ear, nose and tongue • Application and implications in nursing	• Lecture • Explain with Video/ models/charts	• Short answer • MCQ

VII	10 (T)	Describe anatomical positions and structure of bones and joints Identify major bones that make up the axial and appendicular skeleton Classify the joints Identify the application and implications in nursing Describe the structure of muscle Apply the knowledge in performing nursing procedures/skills	**The Musculoskeletal System** **The Skeletal system** • Anatomical positions • Bones – types, structure, growth and Ossification • Axial and appendicular skeleton • Joints – classification, major joints and structure • Application and implications in nursing **The Muscular system** • Types and structure of muscles • Muscle groups – muscles of the head, neck, thorax, abdomen, pelvis, upper limb and lower limbs • Principal muscles – deltoid, biceps, triceps, respiratory, abdominal, pelvic floor, pelvic floor muscles, gluteal muscles and vastus lateralis Major muscles involved in nursing procedures	• Review – discussion • Lecture • Discussions • Explain using charts, skeleton and loose bones and torso • Identifying muscles involved in nursing procedures in lab	• Short answer • Objective type
VIII	5 (T)	Describe the structure of renal system	**The Renal system** • Structure of kidney, ureters, bladder, urethra • Application and implication in nursing	• Lecture • Models/charts	• MCQ • Short answer
IX	5 (T)	Describe the structure of reproductive system	**The Reproductive system** • Structure of male reproductive organs • Structure of female reproductive organs • Structure of breast	• Lecture • Models/charts	• MCQ • Short answer

X	6 (T)	Describe the structure of nervous system including the distribution of the nerves, nerve plexuses Describe the ventricular system	**The Nervous system** • Review Structure of neurons • CNS, ANS and PNS (Central, autonomic and peripheral) • Structure of brain, spinal cord, cranial nerves, spinal nerves, peripheral nerves, functional areas of cerebral cortex • Ventricular system – formation, circulation, and drainage • Application and implication in nursing	• Lecture • Explain with models • Video slides	• MCQ • Short answer

Note: Few lab hours can be planned for visits, observation and handling

(less than 1 credit lab hours are not specified separately)

APPLIED PHYSIOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: PHYS 110

COURSE DESCRIPTION: The course is designed to assists student to acquire comprehensive knowledge of the normal functions of the organ systems of the human body to facilitate understanding of physiological basis of health, identify alteration in functions and provide the student with the necessary physiological knowledge to practice nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding of the normal functioning of various organ systems of the body.
2. Identify the relative contribution of each organ system towards maintenance of homeostasis.
3. Describe the effect of alterations in functions.
4. Apply knowledge of physiological basis to analyze clinical situations and therapeutic applications.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4 (T)	Describe the physiology of cell, tissues, membranes and glands	**General Physiology – Basic concepts** • Cell physiology including transportation across cell membrane • Body fluid compartments, Distribution of total body fluid, intracellular and extracellular compartments, major electrolytes and maintenance of homeostasis • Cell cycle • Tissue – formation, repair • Membranes and glands – functions • Application and implication in nursing	• Review – discussion • Lecture cum Discussion • Video demonstrations	• Quiz • MCQ • Short answer

II	6 (T)	Describe the physiology and mechanism of respiration Identify the muscles of respiration and examine their contribution to the mechanism of breathing	**Respiratory system** • Functions of respiratory organs • Physiology of respiration • Pulmonary circulation – functional features • Pulmonary ventilation, exchange of gases • Carriage of oxygen and carbon-dioxide, Exchange of gases in tissue • Regulation of respiration • Hypoxia, cyanosis, dyspnea, periodic breathing • Respiratory changes during exercise • Application and implication in nursing	• Lecture • Video slides	• Essay • Short answer • MCQ
III	8 (T)	Describe the functions of digestive system	**Digestive system** • Functions of the organs of digestive tract • Saliva – composition, regulation of secretion and functions of saliva • Composition and function of gastric juice, mechanism and regulation of gastric secretion • Composition of pancreatic juice, function, regulation of pancreatic secretion • Functions of liver, gall bladder and pancreas • Composition of bile and function • Secretion and function of small and large intestine • Movements of alimentary tract • Digestion in mouth, stomach, small intestine, large intestine, absorption of food	• Lecture cum Discussion • Video slides	

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
IV	6 (T)	Explain the functions of the heart, and physiology of circulation	**Circulatory and Lymphatic system** • Functions of heart, conduction system, • cardiac cycle, Stroke volume and cardiac output • Blood pressure and Pulse • Circulation – principles, factors influencing blood pressure, pulse • Coronary circulation, Pulmonary and systemic circulation • Heart rate – regulation of heart rate • Normal value and variations • Cardiovascular homeostasis in exercise and posture • Application and implication in nursing	• Lecture • Discussion • Video/Slides	• Short answer • MCQ
V	5 (T)	Describe the composition and functions of blood	**Blood** • Blood – Functions, Physical characteristics • Formation of blood cells • Erythropoiesis – Functions of RBC, RBC life cycle • WBC – types, functions • Platelets – Function and production of platelets • Clotting mechanism of blood, clotting time, bleeding time, PTT • Hemostasis – role of vasoconstriction, platelet plug formation in hemostasis, coagulation factors, intrinsic and extrinsic pathways of coagulation • Blood groups and types • Functions of reticuloendothelial system, immunity • Application in nursing	• Lecture • Discussion • Videos	• Essay • Short answer • MCQ

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
VI	5 (T)	Identify the major endocrine glands and describe their functions	**The Endocrine system** • Functions and hormones of Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands. • Other hormones • Alterations in disease • Application and implication in nursing	• Lecture • Explain using charts	• Short answer • MCQ
VII	4 (T)	Describe the structure of various sensory organs	**The Sensory Organs** • Functions of skin • Vision, hearing, taste and smell • Errors of refraction, aging changes	• Lecture • Video	• Short answer • MCQ
VIII	6 (T)	Describe the functions of bones, joints, various types of muscles, its special properties and nerves supplying them	**Musculoskeletal system** • Bones – Functions, movements of bones of axial and appendicular skeleton, Bone healing • Joints and joint movements • Alteration of joint disease • Properties and Functions of skeletal muscles – mechanism of muscle contraction • Structure and properties of cardiac muscles and smooth muscles Application and implication in nursing	• Lecture • Discussion • Video presentation	• Structured essay • Short answer • MCQ
IX	4 (T)	Describe the physiology of renal system	**Renal system** • Functions of kidney in maintaining homeostasis • GFR • Functions of ureters, bladder and urethra • Micturition • Regulation of renal function • Application and implication in nursing	• Lecture • Charts and models	• Short answer • MCQ

X	4 (T)	Describe the structure of reproductive system	**The Reproductive system** • Female reproductive system – Menstrual cycle, function and hormones of ovary, oogenesis, fertilization, implantation, Functions of breast • Male reproductive system – Spermatogenesis, hormones and its functions, semen • Application and implication in providing nursing care	• Lecture • Explain using charts, models, specimens	• Short answer • MCQ
XI	8 (T)	Describe the functions of brain, physiology of nerve stimulus, reflexes, cranial and spinal nerves	• **Nervous system** • Overview of nervous system • Review of types, structure and functions of neurons • Nerve impulse • Review functions of Brain- Medulla, Pons, Cerebrum, Cerebellum • Sensory and Motor Nervous system • Peripheral Nervous system • Autonomic Nervous system • Limbic system and higher mental Functions- Hippocampus, Thalamus, Hypothalamus • Vestibular apparatus • Functions of cranial nerves • Autonomic functions • Physiology of Pain- somatic, visceral and referred • Reflexes • CSF formation, composition, circulation of CSF, blood brain barrier and blood CSF barrier • Application and implication in nursing	• Lecture cum Discussion • Video slides	• Brief structured essays • Short answer • MCQ • Critical reflection

Note: Few lab hours can be planned for visits, observation and handling

(less than 1 credit lab hours are not specified separately.

APPLIED SOCIOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: SOCI 115

DESCRIPTION: This course is designed to enable the students to develop understanding about basic concepts of sociology and its application in personal and community life, health, illness and nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the scope and significance of sociology in nursing.
2. Apply the knowledge of social structure and different culture in a society in identifying social needs of sick clients.
3. Identify the impact of culture on health and illness.
4. Develop understanding about types of family, marriage and its legislation.
5. Identify different types of caste, class, social change and its influence on health and health practices.
6. Develop understanding about social organization and disorganization and social problems in India.
7. Integrate the knowledge of clinical sociology and its uses in crisis intervention.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	1 (T)	Describe the scope and significance of sociology in nursing	**Introduction** • Definition, nature and scope of sociology • Significance of sociology in nursing	• Lecture • Discussion	• Essay • Short answer
II	15 (T)	Describe the individualization, Groups, processes of Socialization, social change and its importance	**Social structure** • Basic concept of society, community, association and institution • Individual and society • Personal disorganization • Social group – meaning, characteristics, and classification. • Social processes – definition and forms, Co- operation, competition, conflict, accommodation, assimilation, isolation	• Lecture cum Discussion	• Essay • Short answer • Objective type

			• Socialization – characteristics, process, agencies of socialization • Social change – nature, process, and role of nurse • Structure and characteristics of urban, rural and tribal community. • Major health problems in urban, rural and tribal communities • Importance of social structure in nursing profession		
III	8 (T)	Describe culture and its impact on health and disease	**Culture** • Nature, characteristic and evolution of culture • Diversity and uniformity of culture • Difference between culture and civilization • Culture and socialization • Transcultural society • Culture, Modernization and its impact on health and disease	• Lecture • Panel discussion	• Essay • Short answer
IV	8 (T)	Explain family, marriage and legislation related to marriage	**Family and Marriage** • Family – characteristics, basic need, types and functions of family • Marriage – forms of marriage, social custom relating to marriage and importance of marriage • Legislation on Indian marriage and family. • Influence of marriage and family on health and health practices	• Lecture	• Essay • Short answer • Case study report
V	8 (T)	Explain different types of caste and classes in society and its influence on health	**Social stratification** • Introduction – Characteristics & forms of stratification • Function of stratification • Indian caste system – origin and characteristics • Positive and negative impact of caste in society. • Class system and status • Social mobility-meaning and types • Race – concept, criteria of racial classification • Influence of class, caste and race system on health.	• Lecture • Panel discussion	• Essay • Short answer • Objective type

VI	15 (T)	Explain social organization, disorganization, social problems and role of nurse in reducing social problems	**Social organization and disorganization** • Social organization – meaning, elements and types • Voluntary associations • Social system – definition, types, role and status as structural element of social system. • Interrelationship of institutions • Social control – meaning, aims and process of social control • Social norms, moral and values • Social disorganization – definition, causes, Control and planning • Major social problems – poverty, housing, food supplies, illiteracy, prostitution, dowry, Child labor, child abuse, delinquency, crime, substance abuse, HIV/AIDS, COVID-19 • Vulnerable group – elderly, handicapped, minority and other marginal groups. • Fundamental rights of individual, women and children • Role of nurse in reducing social problem and enhance coping • Social welfare programs in India	• Lecture • Group discussion • Observational visit	• Essay • Short answer • Objective type • Visit report
VII	5 (T)	Explain clinical sociology and its application in the hospital and community	**Clinical sociology** • Introduction to clinical sociology • Sociological strategies for developing services for the abused • Use of clinical sociology in crisis intervention	• Lecture, • Group discussion • Role play	• Essay • Short answer

APPLIED PSYCHOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 Hours)

COURSE CODE: PSYC 120

DESCRIPTION: This course is designed to enable the students to develop understanding about basic concepts of psychology and its application in personal and community life, health, illness and nursing. It further provides students opportunity to recognize the significance and application of soft skills and self-empowerment in the practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the importance of psychology in individual and professional life.
2. Develop understanding of the biological and psychological basis of human behaviour.
3. Identify the role of nurse in promoting mental health and dealing with altered personality.
4. Perform the role of nurses applicable to the psychology of different age groups.
5. Identify the cognitive and affective needs of clients.
6. Integrate the principles of motivation and emotion in performing the role of nurse in caring for emotionally sick client.
7. Demonstrate basic understanding of psychological assessment and nurse‘s role.
8. Apply the knowledge of soft skills in workplace and society.
9. Apply the knowledge of self-empowerment in workplace, society and personal life.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Describe scope, branches and significance of psychology in nursing	**Introduction** • Meaning of Psychology • Development of psychology – Scope, branches and methods of psychology • Relationship with other subjects • Significance of psychology in nursing	• Lecture cum Discussion	• Essay • Short answer
II	4 (T)	Describe biology of human behaviour	**Biological basis of behavior – Introduction** • Body mind relationship • Genetics and behaviour • Inheritance of behaviour • Brain and behaviour. • Psychology and sensation – sensory process – normal and abnormal	• Lecture • Discussion	• Essay • Short answer

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III	5 (T)	Describe mentally healthy person and defense mechanisms	**Mental health and mental hygiene** • Concept of mental health and mental hygiene • Characteristic of mentally healthy person • Warning signs of poor mental health • Promotive and preventive mental health strategies and services • Defense mechanism and its implication • Frustration and conflict – types of conflicts and measurements to overcome • Role of nurse in reducing frustration and conflict and enhancing coping • Dealing with ego	• Lecture • Case discussion • Role play	• Essay • Short answer • Objective type
IV	7 (T)	Describe psychology of people in different age groups and role of nurse	**Developmental psychology** • Physical, psychosocial and cognitive development across life span – Prenatal through early childhood, middle to late childhood through adolescence, early and mid-adulthood, late adulthood, death and dying • Role of nurse in supporting normal growth and development across the life span • Psychological needs of various groups in health and sickness – Infancy, childhood, adolescence, adulthood and older adult • Introduction to child psychology and role of nurse in meeting the psychological needs of children • Psychology of vulnerable individuals – challenged, women, sick etc. • Role of nurse with vulnerable groups	• Lecture • Group • discussion	• Essay • Short answer

V	4 (T)	Explain personality and role of nurse in identification and improvement in altered personality	**Personality** • Meaning, definition of personality • Classification of personality • Measurement and evaluation of personality – Introduction • Alteration in personality • Role of nurse in identification of individual personality and improvement in altered personality	• Lecture • Discussion • Demonstration	• Essay and short answer • Objective type
VI	16 (T)	Explain cognitive process and their applications	**Cognitive process** • **Attention** – definition, types, determinants, duration, degree and alteration in attention • **Perception –** Meaning of Perception, principles, factor affecting perception, • **Intelligence** – Meaning of intelligence – Effect of heredity and environment in intelligence, classification, Introduction to measurement of intelligence tests – Mental deficiencies • **Learning –** Definition of learning, types of learning, Factors influencing learning – Learning process, Habit formation • **Memory**-meaning and nature of memory, factors influencing memory, methods to improve memory, forgetting • **Thinking** – types, level, reasoning and problem solving. • **Aptitude** – concept, types, individual differences and variability • Psychometric assessment of cognitive processes – Introduction • Alteration in cognitive processes	• Lecture • Discussion	• Essay and short answer • Objective type

VII	6 (T)	Describe motivation, emotion, attitude and role of nurse in emotionally sick client	**Motivation and emotional processes** • **Motivation** – meaning, concept, types, theories of motivation, motivation cycle, biological and special motives • **Emotions** – Meaning of emotions, development of emotions, alteration of emotion, emotions in sickness – handling emotions in self and other • Stress and adaptation – stress, stressor, cycle, effect, adaptation and coping • **Attitudes** – Meaning of attitudes, nature, factor affecting attitude, attitudinal change, Role of attitude in health and sickness • Psychometric assessment of emotions and attitude – Introduction • Role of nurse in caring for emotionally sick client	• Lecture • Group discussion	• Essay and short answer • Objective type
VIII	4 (T)	Explain psychological assessment and tests and role of nurse	**Psychological assessment and tests – introduction** • Types, development, characteristics, principles, uses, interpretation • Role of nurse in psychological assessment	• Lecture • Discussion • Demonstration	• Short answer • Assessment of practice
IX	10 (T)	Explain concept of soft skill and its application in work place and society	**Application of soft skill** • Concept of soft skill • Types of soft skill – visual, aural and communication skill • The way of communication • Building relationship with client and society • **Interpersonal Relationships (IPR):** Definition, Types, and Purposes, Interpersonal skills, Barriers, Strategies to overcome barriers • Survival strategies – managing time, coping stress, resilience, work – life balance • Applying soft skill to workplace and society	• Lecture • Group discussion • Role play • Refer/Complete Soft skills module	• Essay and short answer

			Presentation skills, social etiquette, telephone etiquette, motivational skills, teamwork etc. • Use of soft skill in nursing	•	•
X	2 (T)	Explain self-empowerment	**Self-empowerment** • Dimensions of self-empowerment • Self-empowerment development • Importance of women's empowerment in society • Professional etiquette and personal grooming • Role of nurse in empowering others	• Lecture • Discussion	• Short answer • Objective type

NURSING FOUNDATION - I (Including First Aid Module)

PLACEMENT: I SEMESTER

TIME-THEORY: 6 Credits (120 hours)

PRACTICUM: Skill Lab: 2 Credits (80 hours) and Clinical: 2 Credits (160 hours)

COURSE CODE: N-NF(I) 125

DESCRIPTION: This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding about the concept of health, illness and scope of nursing within health care services.
2. Apply values, code of ethics and professional conduct in professional life.
3. Apply the principles and methods of effective communication in establishing communication links with patients, families and other health team members.
4. Develop skill in recording and reporting.
5. Demonstrate competency in monitoring and documenting vital signs.
6. Describe the fundamental principles and techniques of infection control and biomedical waste management.
7. Identify and meet the comfort needs of the patients.
8. Perform admission, transfer, and discharge of a patient under supervision applying the knowledge.
9. Demonstrate understanding and application of knowledge in caring for patients with restricted mobility.
10. Perform first aid measures during emergencies.
11. Identify the educational needs of patients and demonstrate basic skills of patient education.

***Mandatory Module used in Teaching/Learning: First Aid: 40 Hours (including Basic CPR)**

COURSE OUTLINE

T – Theory, SL – Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Describe the concept of health and illness	**Introduction to health and illness** • Concept of Health – Definitions (WHO), Dimensions • Maslow's hierarchy of needs • Health – Illness continuum • Factors influencing health • Causes and risk factors for developing illnesses • Illness – Types, illness behavior • Impact of illness on patient and family	• Lecture • Discussion	• Essay • Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Describe the concept of health and illness	**Introduction to health and illness** • Concept of Health – Definitions (WHO), Dimensions • Maslow's hierarchy of needs • Health – Illness continuum • Factors influencing health • Causes and risk factors for developing illnesses • Illness – Types, illness behavior • Impact of illness on patient and family	• Lecture • Discussion	• Essay • Short answer • Objective type
II	5 (T)	Describe the levels of illness prevention and care, health care services	**Health Care Delivery Systems –** ***Introduction of Basic Concepts & Meanings*** • Levels of Illness Prevention – Primary (Health Promotion), Secondary and Tertiary • Levels of Care – Primary, Secondary and Tertiary • Types of health care agencies/ services – Hospitals, clinics, Hospice, rehabilitation centres, extended care facilities Hospitals – Types, Organization and Functions	• Lecture • Discussion	• Essay • Short answer • Objective type
III	12 (T)	Trace the history of Nursing Explain the concept, nature and scope of nursing Describe values, code of ethics and professional conduct for nurses in India	**History of Nursing and Nursing as a profession** • History of Nursing, History of Nursing in India • Contributions of Florence Nightingale • Nursing – Definition – Nurse, Nursing, Concepts, philosophy, objectives, Characteristics, nature and Scope of Nursing/ Nursing practice, Functions of nurse, Qualities of a nurse, Categories of nursing personnel • Nursing as a profession – definition and characteristics/criteria of profession • Values – Introduction – meaning and importance • Code of ethics and professional conduct for nurses – Introduction	• Lecture • Discussion • Case discussion • Role plays	• Essay • Short answers • Objective type

IV	8 (T) 3 (SL)	Describe the process, principles, and types of communication Explain therapeutic, non-therapeutic and professional communication Communicate effectively with patients, their families and team members	**Communication and Nurse Patient Relationship** • Communication – Levels, Elements and Process, Types, Modes, Factors influencing communication • Methods of effective communication/therapeutic communication techniques • Barriers to effective communication/non- therapeutic communication techniques • Professional communication • Helping Relationships (Nurse Patient Relationship) – Purposes and Phases • Communicating effectively with patient, families and team members • Maintaining effective human relations and communication with vulnerable groups (children, women, physically and mentally challenged and elderly)	• Lecture • Discussion • Role play and video film on Therapeutic Communication	• Essay • Short answer • Objective type
V	4 (T) 2 (SL)	Describe the purposes, types and techniques of recording and reporting Maintain records and reports accurately	**Documentation and Reporting** • Documentation – Purposes of Reports and Records • Confidentiality • Types of Client records/Common Record- keeping forms • Methods/Systems of documentation/Recording Guidelines for documentation • Do‘s and Don‘ts of documentation/Legal guidelines for Documentation/Recording • Reporting – Change of shift reports, Transfer reports, Incident reports	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

VI	15 (T) 20 (SL)	Describe principles and techniques of monitoring and maintaining vital signs Assess and record vital signs accurately	**Vital signs** • Guidelines for taking vital signs • *Body temperature* – ○ Definition, Physiology, Regulation, Factors affecting body temperature ○ Assessment of body temperature – sites, equipment and technique ○ Temperature alterations – Hyperthermia, Heat Cramps, Heat Exhaustion, Heatstroke, Hypothermia ○ Fever/Pyrexia – Definition, Causes, Stages, Types • Nursing Management ○ Hot and Cold applications • *Pulse*: ○ Definition, Physiology and Regulation, Characteristics, Factors affecting pulse ○ Assessment of pulse – sites, equipment and technique ○ Alterations in pulse • *Respiration:* ○ Definition, Physiology and Regulation, Mechanics of breathing, Characteristics, Factors affecting respiration ○ Assessment of respirations – technique ○ Arterial Oxygen saturation ○ Alterations in respiration • *Blood pressure*: ○ Definition, Physiology and Regulation, Characteristics, Factors affecting BP ○ Assessment of BP – sites, equipment and technique, Common Errors in BP Assessment ○ Alterations in Blood Pressure • Documenting Vital Signs	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • Document the given values of temperature, pulse, and respiration in the graphic sheet • OSCE
VII	3 (T)	Maintain equipment and linen	**Equipment and Linen** • Types – Disposables and reusable oLinen, rubber goods, glassware, metal, plastics, furniture • Introduction – Indent, maintenance, Inventory		

VIII	10 (T) 3 (SL)	Describe the basic principles and techniques of infection control and biomedical waste management	**Introduction to Infection Control in Clinical setting Infection** • Nature of infection • Chain of infection • Types of infection • Stages of infection • Factors increasing susceptibility to infection • Body defenses against infection – Inflammatory response & Immune response • Health care associated infection (Nosocomial infection) **Introductory concept of Asepsis – Medical & Surgical asepsis** ***Precautions*** • Hand Hygiene • (Hand washing and use of hand Rub) • Use of Personal Protective Equipment (PPE) • Standard precautions ***Biomedical Waste management*** • Types of hospital waste, waste segregation and hazards – Introduction	• Lecture • Discussion • Demonstration • Observation of autoclaving and other sterilization techniques • Video presentation on medical & surgical asepsis	• Essay • Short answer • Objective type
			Comfort, Rest & Sleep and Pain • Comfort ○ Factors Influencing Comfort ○ Types of beds including latest beds, purposes & bed making ○ Therapeutic positions ○ Comfort devices • Sleep and Rest ○ Physiology of sleep ○ Factors affecting sleep ○ Promoting Rest and sleep ○ Sleep Disorders	•	•

IX	15 (T) 15 (SL)	Identify and meet the comfort needs of the patients	• Pain (Discomfort) ○ Physiology ○ Common cause of pain ○ Types ○ Assessment – pain scales and narcotic scales • Pharmacological and Non-pharmacological pain-relieving measures – Use of narcotics, TENS devices, PCA • Invasive techniques of pain management • Any other newer measures ○ CAM (Complementary & Alternative healing Modalities	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • OSCE
X	5 (T) 3 (SL)	Describe the concept of patient environment	**Promoting Safety in Health Care Environment** • Physical environment – Temperature, Humidity, Noise, Ventilation, Light, Odor, Pest control • Reduction of Physical hazards – fire, accidents • Fall Risk Assessment • Role of nurse in providing safe and clean environment • Safety devices – ○ Restraints – Types, Purposes, Indications, Legal Implications and Consent, Application of Restraints- Skill and Practice guidelines ○ Other Safety Devices – Side rails, Grab bars, Ambu alarms, non-skid slippers etc.	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type
XI	6 (T) 2 (SL)	Explain and perform admission, transfer, and discharge of a patient	**Hospital Admission and discharge** • Admission to the hospital Unit and preparation of unit • Admission bed • Admission procedure • Medico-legal issues • Roles and Responsibilities of the nurse • Discharge from the hospital • Types – Planned discharge, LAMA and Abscond, Referrals and transfers • Discharge Planning oDischarge • procedure oMedico-legal issues • Roles and Responsibilities of the nurse • Care of the unit after discharge	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

XII	8 (T)
	10 (SL)
		Demonstrate skill in caring for patients with restricted mobility	**Mobility and Immobility**
			• Elements of Normal Movement, Alignment & Posture, Joint Mobility, Balance, Coordinated Movement
			• Principles of body mechanics
			• Factors affecting Body Alignment and activity
			• Exercise – Types and benefits
			• Effects of Immobility
			• Maintenance of normal Body Alignment and Activity
			• Alteration in Body Alignment and mobility
			• Nursing interventions for impaired Body Alignment and Mobility – assessment, types, devices used, method
			  • Range of motion exercises
			  • Muscle strengthening exercises
			  • Maintaining body alignment – positions
			  • Moving
			  • Lifting
			  • Transferring
			  • Walking
			• Assisting clients with ambulation
			• Care of patients with Immobility using Nursing process approach
			• Care of patients with casts and splints
				• Lecture
				• Discussion
				• Demonstration & Re-demonstration
					• Essay
					• Short answer Objective type
					• OSCE

XIII	4 (T) 2 (SL)	Describe the principles and practice of patient education	**Patient education** • Patient Teaching – Importance, Purposes, Process • Integrating nursing process in patient teaching	• Discussion • Role plays	• Essay • Short answer • Objective type

XIV	20 (T) 20 (SL)	Explain and apply principles of First Aid during emergencies	**First Aid*** • Definition, Basic Principles, Scope & Rules • First Aid Management o Wounds, Hemorrhage & Shock o Musculoskeletal Injuries – Fractures, Dislocation, Muscle injuries o Transportation of Injured persons o Respiratory Emergencies & Basic CPR o Unconsciousness o Foreign Bodies – Skin, Eye, Ear, Nose, Throat & Stomach o Burns & Scalds o Poisoning, Bites & Stings oFrostbite & Effects of Heat o Community Emergencies	• Lecture • Discussion • Demonstration & Re-demonstration • Module completion • National Disaster Management Authority (NDMA) / Indian Red Cross Society (IRCS) First Aid module	• Essay • Short answer • Objective type • OSCE

*Mandatory module

CLINICAL PRACTICUM

Clinical Practicum: 2 Credits (160 hours), 10 weeks × 16 hours per week

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will be able to

1. Maintain effective human relations (projecting professional image)
2. Communicate effectively with patient, families and team members
3. Demonstrate skills in techniques of recording and reporting
4. Demonstrate skill in monitoring vital signs
5. Care for patients with altered vital signs
6. Demonstrate skill in implementing standard precautions and use of PPE
7. Demonstrate skill in meeting the comfort needs of the patients
8. Provide safe and clean environment
9. Demonstrate skill in admission, transfer, and discharge of a patient
10. Demonstrate skill in caring for patients with restricted mobility
11. Plan and provide appropriate health teaching following the principles
12. Acquire skills in assessing and performing First Aid during emergencies.

SKILL LAB

Use of Mannequins and Simulators

S.No.	Competencies	Mode of Teaching
1.	Therapeutic Communication and Documentation	Role Play
2.	Vital signs	Simulator/Standardized patient
3.	Medical and Surgical Asepsis	Videos/Mannequin
4.	Pain Assessment	Standardized patient
5.	Comfort Devices	Mannequin
6.	Therapeutic Positions	Mannequin
7.	Physical Restraints and Side rails	Mannequin
8.	ROM Exercises	Standardized patient
9.	Ambulation	Standardized patient
10.	Moving and Turning patients in bed	Mannequin
11.	Changing position of helpless patients	Mannequin/Standardized patient
12.	Transferring patients' bed to stretcher/wheel chair	Mannequin/Standardized patient
13.	Admission, Transfer, Discharge & Health Teaching	Role Play

CLINICAL POSTINGS – General Medical/Surgical Wards
10 weeks × 16 hours/week = 160 Hours

Clinical Unit	Duration (in Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
General Medical/ Surgical wards	2	Maintain effective human relations (projecting professional image) Communicate effectively with patient, families and team members	**Communication and Nurse patient relationship** • Maintaining Communication with patient and family and interpersonal relationship • Documentation and Reporting ○ Documenting patient care and procedures ○ Verbal report ○ Written report		• OSCE
	2	Demonstrate skill in monitoring vital signs Care for patients with altered vital signs Demonstrate skill in implementing standard precautions and use of PPE	*Vital signs* • Monitor/measure and document vital signs in a graphic sheet ○ Temperature (oral, tympanic, axillary) ○ Pulse (Apical and peripheral pulses) ○ Respiration ○ Blood pressure ○ Pulse oximetry • Interpret and report alteration • Cold Applications – Cold Compress, Ice cap, Tepid Sponging • Care of equipment – thermometer, BP apparatus, Stethoscope, Pulse oximeter *Infection control in Clinical settings* • Hand hygiene • Use of PPE	• Care of patients with alterations in vital signs- 1	• Assessment of clinical skills using checklist • OSCE

	3	Demonstrate skill in meeting the comfort needs of the patients Provide safe and clean environment	**Comfort, Rest & Sleep, Pain and Promoting Safety in Health Care Environment** *Comfort, Rest & Sleep* • Bed making- ○ Open ○ Closed ○ Occupied ○ Post-operative ○ Cardiac bed ○ Fracture bed ○ Comfort devices ○ Pillows ○ Over bed table/cardiac table ○ Back rest ○ Bed Cradle ○ Therapeutic Positions ○ Supine ○ Fowlers (low, semi, high) ○ Lateral o Prone o Sim‘s ○ Trendelenburg ○ Dorsal recumbent ○ Lithotomy ○ Knee chest ○ Pain ○ Pain assessment and provision for comfort ○ Promoting Safety in Health Care Environment ○ Care of Patient ‘s Unit ○ Use of Safety devices: ○ Side Rails ○ Restraints (Physical) ○ Fall risk assessment and Post Fall Assessment	Fall risk assessment-1	• Assessment of clinical skills using checklist • OSCE

Clinical Unit	Duration (in Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
		Demonstrate skill in admission, transfer, and discharge of a patient	**Hospital Admission and discharge, Mobility and Immobility and Patient education** *Hospital Admission and discharge* Perform & Document: • Admission		• Assessment of clinical skills using checklist • OSCE
	2	Demonstrate skill in caring for patients with restricted mobility	*Mobility and Immobility* • Range of Motion Exercises • Assist patient in: oMoving ○ Turning ○ Logrolling • Changing position of helpless patient • Transferring (Bed to and from chair/wheelchair/ stretcher) *Patient education*	• Individual teaching-1	• Assessment of clinical skills using checklist • OSCE
	1	Plan and provide appropriate health teaching following the principles	**First aid and Emergencies** • Bandaging Techniques ○ Basic Bandages: ▪ Circular ▪ Spiral ▪ Reverse-Spiral ▪ Recurrent ▪ Figure of Eight ○ Special Bandages: ▪ Caplin ▪ Eye/Ear Bandage ▪ Jaw Bandage ▪ Shoulder Spica ▪ Thumb spica ▪ Triangular Bandage/ Sling (Head & limbs) ▪ Binders	• Module completion National Disaster Management Authority (NDMA) First Aid module (To complete it in clinicals if not completed during lab)	• Assessment of clinical skills using checklist • OSCE (first aid competencies)
		Demonstrate skills in assessing and performing First Aid during emergencies			

SYLLABUS

II SEMESTER

B.Sc. NURSING

APPLIED BIOCHEMISTRY

PLACEMENT: II SEMESTER

THEORY: 2 credits (40 hours) (includes lab hours also)

COURSE CODE: BIOC 135

COURSE DESCRIPTION: The course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body, its alterations in disease conditions and to apply this knowledge in the practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe the metabolism of carbohydrates and its alterations.
2. Explain the metabolism of lipids and its alterations.
3. Explain the metabolism of proteins and amino acids and its alterations.
4. Explain clinical enzymology in various disease conditions.
5. Explain acid base balance, imbalance and its clinical significance.
6. Describe the metabolism of hemoglobin and its clinical significance.
7. Explain different function tests and interpret the findings.
8. Illustrate the immunochemistry.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Describe the metabolism of carbohydrates and its alterations	**Carbohydrates** • Digestion, absorption and metabolism of carbohydrates and related disorders • Regulation of blood glucose • Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief • Investigations of Diabetes Mellitus ○ OGTT – Indications, Procedure, Interpretation and types of GTT curve ○ Mini GTT, extended GTT, GCT, IV GTT ○ HbA1c (Only definition) • Hypoglycemia – Definition & causes	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer

I	8 (T)	Describe the metabolism of carbohydrates and its alterations	**Carbohydrates** • Digestion, absorption and metabolism of carbohydrates and related disorders • Regulation of blood glucose • Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief • Investigations of Diabetes Mellitus ○ OGTT – Indications, Procedure, Interpretation and types of GTT curve ○ Mini GTT, extended GTT, GCT, IV GTT ○ HbA1c (Only definition) Hypoglycemia – Definition & causes	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer
II	8 (T)	Explain the metabolism of lipids and its alterations	**Lipids** • Fatty acids – Definition, classification • Definition & Clinical significance of MUFA & PUFA, Essential fatty acids, Trans fatty acids • Digestion, absorption & metabolism of lipids & related disorders • Compounds formed from cholesterol • Ketone bodies (name, types & significance only) • Lipoproteins – types & functions (metabolism not required) • Lipid profile • Atherosclerosis (in brief)	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer

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III	9 (T)	Explain the metabolism of amino acids and proteins Identify alterations in disease conditions	**Proteins** • Classification of amino acids based on nutrition, metabolic rate with examples • Digestion, absorption & metabolism of protein & related disorders • Biologically important compounds synthesized from various amino acids (only names) • In born errors of amino acid metabolism – only aromatic amino acids (in brief) • Plasma protein – types, function & normal values • Causes of proteinuria, hypoproteinemia, hyper-gamma globinemia • Principle of electrophoresis, normal & abnormal electrophoretic patterns (in brief)	• Lecture cum Discussion • Explain using charts, models and slides	• Essay • Short answer • Very short answer
IV	4 (T)	Explain clinical enzymology in various disease conditions	**Clinical Enzymology** • Isoenzymes – Definition & properties • Enzymes of diagnostic importance in o Liver Diseases – ALT, AST, ALP, GGT o Myocardial infarction – CK, cardiac troponins, AST, LDH o Muscle diseases – CK, Aldolase o Bone diseases – ALP o Prostate cancer – PSA, ACP	• Lecture cum Discussion • Explain using charts and slides	• Essay • Short answer • Very short answer
V	3 (T)	Explain acid base balance, imbalance and its clinical significance	**Acid base maintenance** • pH – definition, normal value • Regulation of blood pH – blood buffer, respiratory & renal • ABG – normal values • Acid base disorders – types, definition & causes	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer

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VI	2 (T)	Describe the metabolism of hemoglobin and its clinical significance	**Heme catabolism** • Heme degradation pathway • Jaundice – type, causes, urine & blood investigations (van den berg test)	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer
VII	3 (T)	Explain different function tests and interpret the findings	**Organ function tests (biochemical parameters & normal values only)** • Renal • Liver • Thyroid	• Lecture cum Discussion • Visit to Lab • Explain using charts and slides	• Short answer • Very short answer
VIII	3 (T)	Illustrate the immunochemistry	**Immunochemistry** • Structure & functions of immunoglobulin • Investigations & interpretation – ELISA	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Short answer • Very short answer

Note: Few lab hours can be planned for observation and visits (Less than 1 credit, lab hours are not specified separately).

APPLIED NUTRITION AND DIETETICS

PLACEMENT: II SEMESTER
TIME-THEORY: 3 credits (60 hours) Theory: 45 hours, Lab: 15 hours
COURSE CODE: NUTR 140

COURSE DESCRIPTION: The course is designed to assist the students to acquire basic knowledge and understanding of the principles of Nutrition and Dietetics and apply this knowledge in the practice of Nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the importance of nutrition in health and wellness.
2. Apply nutrient and dietary modifications in caring patients.
3. Explain the principles and practices of Nutrition and Dietetics.
4. Identify nutritional needs of different age groups and plan a balanced diet for them.
5. Identify the dietary principles for different diseases.
6. Plan therapeutic diet for patients suffering from various disease conditions.
7. Prepare meals using different methods and cookery rules.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Define nutrition and its relationship to Health	**Introduction to Nutrition** **Concepts** • Definition of Nutrition & Health • Malnutrition – Under Nutrition & Over Nutrition • Role of Nutrition in maintaining health • Factors affecting food and nutrition **Nutrients** • Classification • Macro & Micronutrients • Organic & Inorganic • Energy Yielding & Non-Energy Yielding **Food** • Classification – Food groups • Origin	• Lecture cum Discussion • Charts/Slides	• Essay • Short answer • Very short answer

II	3 (T)	Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates Explain BMR and factors affecting BMR	**Carbohydrates** • Composition – Starches, sugar and cellulose • Recommended Daily Allowance (RDA) • Dietary sources • Functions **Energy** • Unit of energy – Kcal • Basal Metabolic Rate (BMR) • Factors affecting BMR	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
III	3 (T)	Describe the classification, Functions, sources and RDA of proteins.	**Proteins** • Composition Eight essential amino acids • Functions • Dietary sources • Protein requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
IV	2 (T)	Describe the classification, Functions, sources and RDA of fats	**Fats** • Classification – Saturated & unsaturated • Calorie value • Functions • Dietary sources of fats and fatty acids • Fat requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
V	3 (T)	Describe the classification, functions, sources and RDA of vitamins	**Vitamins** • Classification – fat soluble & water soluble • Fat soluble – Vitamins A, D, E, and K • Water soluble – Thiamine (vitamin B1), Riboflavin (vitamin B2), Nicotinic acid, Pyridoxine (vitamin B6), Pantothenic acid, Folic acid, Vitamin B12, Ascorbic acid (vitamin C) • Functions, Dietary Sources & Requirements – RDA of every vitamin	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer

VI	3 (T)	Describe the classification, functions, sources and RDA of minerals	**Minerals** • Classification – Major minerals (Calcium, phosphorus, sodium, potassium and magnesium) and Trace elements • Functions • Dietary Sources • Requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Short answer • Very short answer
VII	7 (T) 8 (L)	Describe and plan balanced diet for different age groups, pregnancy, and lactation	**Balanced diet** • Definition, principles, steps • Food guides – Basic Four Food Groups • RDA – Definition, limitations, uses • Food Exchange System • Calculation of nutritive value of foods • Dietary fibre **Nutrition across life cycle** • Meal planning/Menu planning – Definition, principles, steps • Infant and Young Child Feeding (IYCF) guidelines – breast feeding, infant foods • Diet plan for different age groups – • Children, adolescents and elderly • Diet in pregnancy – nutritional requirements and balanced diet plan • Anemia in pregnancy – diagnosis, diet for anemic pregnant women, iron & folic acid supplementation and counseling • Nutrition in lactation – nutritional requirements, diet for lactating mothers, complementary feeding/ weaning	• Lecture cum Discussion • Meal planning • Lab session on ○ Preparation of balanced diet for different categories ○ Low cost nutritious dishes	• Short answer • Very short answer

VIII	6 (T)	Classify and describe the common nutritional deficiency disorders and identify nurses 'role in assessment, management and prevention	**Nutritional deficiency disorders** • Protein energy malnutrition – magnitude of the problem, causes, classification, signs & symptoms, Severe acute malnutrition (SAM), management & prevention and nurses 'role • Childhood obesity – signs & symptoms, assessment, management & prevention and nurses 'role • Vitamin deficiency disorders – vitamin A, B, C & D deficiency disorders –causes, signs & symptoms, management & prevention and nurses 'role • Mineral deficiency diseases – iron, iodine and calcium deficiencies –causes, signs & symptoms, management & prevention and nurses' role	• Lecture cum Discussion • Charts/Slides • Models	• Essay • Short answer • Very short answer
IX	4 (T) 7 (L)	Principles of diets in various diseases	**Therapeutic diets** • Definition, Objectives, Principles • Modifications – Consistency, Nutrients, • Feeding techniques. • Diet in Diseases – Obesity, Diabetes Mellitus, CVD, Underweight, Renal diseases, Hepatic disorders Constipation, Diarrhea, Pre and Post-operative period	• Lecture cum Discussion • Meal planning • Lab session on preparation of therapeutic diets	• Essay • Short answer • Very short answer
X	3 (T)	Describe the rules and preservation of nutrients	**Cookery rules and preservation of nutrients** • Cooking – Methods, Advantages and Disadvantages • Preservation of nutrients • Measures to prevent loss of nutrients during preparation • Safe food handling and Storage of foods • Food preservation • Food additives and food adulteration • Prevention of Food Adulteration Act (PFA) • Food standards	• Lecture cum Discussion • Charts/Slides	• Essay • Short answer • Very short answer

XI	4 (T)	Explain the methods of nutritional assessment and nutrition education	**Nutrition assessment and nutrition education** • Objectives of nutritional assessment • Methods of assessment – clinical examination, anthropometry, laboratory & biochemical assessment, assessment of dietary intake including Food frequency questionnaire (FFQ) method • Nutrition education – purposes, principles and methods	• Lecture cum Discussion • Demonstration • Writing nutritional assessment report	• Essay • Short answer • Evaluation of Nutritional assessment report
XII	3 (T)	Describe nutritional problems in India and nutritional programs	**National Nutritional Programs and role of nurse** • Nutritional problems in India • National nutritional policy • *National nutritional programs* – Vitamin A Supplementation, Anemia Mukt Bharat Program, Integrated Child Development Services (ICDS), Mid-day Meal Scheme (MDMS), National Iodine Deficiency Disorders Control Program (NIDDCP), Weekly Iron Folic Acid Supplementation (WIFS) and others as introduced • Role of nurse in every program	• Lecture cum Discussion	• Essay • Short answer • Very short answer
XIII	2 (T)	Discuss the importance of food hygiene and food safety Explain the Acts related to food safety	**Food safety** • Definition, Food safety considerations & measures • Food safety regulatory measures in India – Relevant Acts • Five keys to safer food • Food storage, food handling and cooking • General principles of food storage of food items (ex. milk, meat) • Role of food handlers in food borne diseases • Essential steps in safe cooking practices	• Guided reading on related acts	• Quiz • Short answer

NOTE: Food borne diseases and food poisoning are dealt in Community Health Nursing I.

NURSING FOUNDATION - II (including Health Assessment Module)

PLACEMENT: II SEMESTER

THEORY: 6 Credits (120 hours)

PRACTICUM: Skill Lab: 3 Credits (120 hours), Clinical: 4 Credits (320 hours)

COURSE CODE: N-NF(II) 125

COURSE DESCRIPTION: This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding about fundamentals of health assessment and perform health assessment in supervised clinical settings
2. Demonstrate fundamental skills of assessment, planning, implementation and evaluation of nursing care using Nursing process approach in supervised clinical settings
3. Assess the Nutritional needs of patients and provide relevant care under supervision
4. Identify and meet the hygienic needs of patients
5. Identify and meet the elimination needs of patient
6. Interpret findings of specimen testing applying the knowledge of normal values
7. Promote oxygenation based on identified oxygenation needs of patients under supervision
8. Review the concept of fluid, electrolyte balance integrating the knowledge of applied physiology
9. Apply the knowledge of the principles, routes, effects of administration of medications in administering medication
10. Calculate conversions of drugs and dosages within and between systems of measurements
11. Demonstrate knowledge and understanding in caring for patients with altered functioning of sense organs and unconsciousness
12. Explain loss, death and grief
13. Describe sexual development and sexuality
14. Identify stressors and stress adaptation modes
15. Integrate the knowledge of culture and cultural differences in meeting the spiritual needs
16. Explain the introductory concepts relevant to models of health and illness in patient care

***Mandatory Module used in Teaching/Learning:**

Health Assessment Module: 40 hours

COURSE OUTLINE
T – Theory, SL – Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning	Assessment Methods
I	20 (T) 20 (SL)	Describe the purpose and process of health assessment and perform assessment under supervised clinical practice	**Health Assessment** • Interview techniques • Observation techniques • Purposes of health assessment • Process of Health assessment oHealth history ○ Physical examination: ▪ Methods: Inspection, Palpation, Percussion, Auscultation, Olfaction ▪ Preparation for examination: patient and unit ▪ General assessment ▪ Assessment of each body system ▪ Documenting health assessment findings	• Modular Learning ***Health Assessment Module** • Lecture cum Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE
II	13 (T) 8 (SL)	Describe assessment, planning, implementation and evaluation of nursing care using Nursing process approach	**The Nursing Process** • Critical Thinking Competencies, Attitudes for Critical Thinking, Levels of critical thinking in Nursing • Nursing Process Overview **Assessment** ▪ Collection of Data: Types, Sources, Methods ▪ Organizing Data ▪ Validating Data ▪ Documenting Data ○ **Nursing Diagnosis** ▪ Identification of client problems, risks and strengths ▪ Nursing diagnosis statement – parts, Types, Formulating, Guidelines for formulating Nursing Diagnosis ▪ NANDA approved diagnoses ▪ Difference between medical and nursing diagnosis	• Lecture • Discussion • Demonstration • Supervised Clinical Practice	• Essay • Short answer • Objective type • Evaluation of care plan

			o**Planning** ▪ Types of planning ▪ Establishing Priorities ▪ Establishing Goals and Expected Outcomes – Purposes, types, guidelines, Components of goals and outcome statements ▪ Types of Nursing Interventions, selecting interventions: Protocols and Standing Orders ▪ Introduction to Nursing Intervention Classification and Nursing Outcome Classification ▪ Guidelines for writing care plan o **Implementation** ▪ Process of Implementing the plan of care ▪ Types of care – Direct and Indirect o **Evaluation** ▪ Evaluation Process, Documentation and Reporting		
III	5 (T) 5 (SL)	Identify and meet the Nutritional needs of patients	**Nutritional needs** • Importance • Factors affecting nutritional needs • Assessment of nutritional status • *Review:* special diets – Solid, Liquid, Soft • *Review* on therapeutic diets • Care of patient with Dysphagia, Anorexia, Nausea, Vomiting Meeting Nutritional needs: Principles, equipment, procedure, indications Oral Enteral: Nasogastric/ Orogastric Introduction to other enteral feeds – types, indications, Gastrostomy, Jejunostomy Parenteral – TPN (Total Parenteral Nutrition)	• Lecture • Discussion • Demonstration • Exercise • Supervised Clinical practice	• Essay • Short answer • Objective type • Evaluation of nutritional assessment & diet planning

IV	5 (T) 15 (SL)	Identify and meet the hygienic needs of patients	**Hygiene** • Factors Influencing Hygienic Practice • Hygienic care: Indications and purposes, effects of neglected care ○ Care of the Skin – (Bath, feet and nail, Hair Care) ○ Care of pressure points ○ Assessment of Pressure Ulcers using Braden Scale and Norton Scale ○ Pressure ulcers – causes, stages and manifestations, care and prevention ○ Perineal care/Meatal care ○ Oral care, Care of Eyes, Ears and Nose including assistive devices (eye glasses, contact lens, dentures, hearing aid)	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE
V	10 (T) 10 (SL)	Identify and meet the elimination needs of patient	**Elimination needs** • Urinary Elimination ○ Review of Physiology of Urine Elimination, Composition and characteristics of urine ○ Factors Influencing Urination ○ Alteration in Urinary Elimination ○ Facilitating urine elimination: assessment, types, equipment, procedures and special considerations ○ Providing urinal/bed pan ○ Care of patients with ▪ Condom drainage ▪ Intermittent Catheterization ▪ Indwelling Urinary catheter and urinary drainage ▪ Urinary diversions ▪ Bladder irrigation	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE

			• Bowel Elimination ○ Review of Physiology of Bowel Elimination, Composition and characteristics of feces ○ Factors affecting Bowel elimination ○ Alteration in Bowel Elimination ○ Facilitating bowel elimination: Assessment, equipment, procedures ▪ Enemas ▪ Suppository ▪ Bowel wash ▪ Digital Evacuation of impacted feces ▪ Care of patients with Ostomies (Bowel Diversion Procedures)		
VI	3 (T) 4 (SL)	Explain various types of specimens and identify normal values of tests Develop skill in specimen collection, handling and transport	**Diagnostic testing** • Phases of diagnostic testing (pre-test, intra-test & post-test) in Common investigations and clinical implications ○ Complete Blood Count ○ Serum Electrolytes ○ LFT ○ Lipid/Lipoprotein profile ○ Serum Glucose – AC, PC, HbA1c ○ Monitoring Capillary Blood Glucose (Glucometer Random Blood Sugar – GRBS) ○ Stool Routine Examination ○ Urine Testing – Albumin, Acetone, pH, Specific Gravity ○ Urine Culture, Routine, Timed Urine Specimen ○ Sputum culture ○ Overview of Radiologic & Endoscopic Procedures	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

VII	11 (T) 10 (SL)	Assess patients for oxygenation needs, promote oxygenation and provide care during oxygen therapy	**Oxygenation needs** • Review of Cardiovascular and Respiratory Physiology • Factors affecting respiratory functioning • Alterations in Respiratory Functioning • Conditions affecting o Airway o Movement of air o Diffusion o Oxygen transport o Alterations in oxygenation o Nursing interventions to promote oxygenation: assessment, types, equipment used & procedure o Maintenance of patent airway o Oxygen administration o Suctioning – oral, tracheal o Chest physiotherapy – Percussion, Vibration & Postural drainage o Care of Chest drainage – principles & purposes o Pulse Oximetry – Factors affecting measurement of oxygen saturation using pulse oximeter, Interpretation o Restorative & continuing care o Hydration o Humidification o Coughing techniques o Breathing exercises o Incentive spirometry	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type

VIII	5 (T) 10 (SL)	Describe the concept of fluid, electrolyte balance	**Fluid, Electrolyte, and Acid – Base Balances** • Review of Physiological Regulation of Fluid, Electrolyte and Acid-Base Balances • Factors Affecting Fluid, Electrolyte and Acid-Base Balances • Disturbances in fluid volume: ○ Deficit ▪ Hypovolemia ▪ Dehydration ○ Excess ▪ Fluid overload ▪ Edema • Electrolyte imbalances (hypo and hyper) Acid-base imbalances Metabolic – acidosis & alkalosis Respiratory – acidosis & alkalosis Intravenous therapy Peripheral venipuncture sites Types of IV fluids Calculation for making IV fluid plan Complications of IV fluid therapy Measuring fluid intake and output Administering Blood and Blood components Restricting fluid intake Enhancing Fluid intake	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • Problem solving – calculations

IX	20 (T) 22 (SL)	Explain the principles, routes, effects of administration of medications Calculate conversions of drugs and dosages within and between systems of measurements Administer oral and topical medication and document accurately under supervision	**Administration of Medications** • Introduction – Definition of Medication, Administration of Medication, Drug Nomenclature, Effects of Drugs, Forms of Medications, Purposes, Pharmacodynamics and Pharmacokinetics • Factors influencing Medication Action • Medication orders and Prescriptions • Systems of measurement • Medication dose calculation • Principles, 10 rights of Medication Administration • Errors in Medication administration • Routes of administration • Storage and maintenance of drugs and Nurses responsibility • Terminologies and abbreviations used in prescriptions and medications orders • Developmental considerations • Oral, Sublingual and Buccal routes: Equipment, procedure • Introduction to Parenteral Administration of Drugs – Intramuscular, Intravenous, Subcutaneous, Intradermal: Location of site, Advantages and disadvantages of the specific sites, Indication and contraindications for the different routes and sites. • Equipment – Syringes & needles, cannulas, Infusion sets – parts, types, sizes • Types of vials and ampoules, Preparing Injectable medicines from vials and ampoules oCare of equipment: decontamination and disposal of syringes, needles, o Application to skin & mucous membrane	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • OSCE

			○ Direct application of liquids, Gargle and swabbing the throat ○ Insertion of Drug into body cavity: Suppository/ medicated packing in rectum/vagina ○ Instillations: Ear, Eye, Nasal, Bladder, and Rectal ○ Irrigations: Eye, Ear, Bladder, Vaginal and Rectal ○ Spraying: Nose and throat • Inhalation: Nasal, oral, endotracheal/tracheal (steam, oxygen and medications) – purposes, types, equipment, procedure, recording and reporting of medications administered • Other Parenteral Routes: Meaning of epidural, intrathecal, intraosseous, intraperitoneal, intra-pleural, intra- arterial		
X	5 (T) 6 (SL)	Provide care to patients with altered functioning of sense organs and unconsciousness in supervised clinical practice	**Sensory needs** • Introduction • Components of sensory experience – Reception, Perception & Reaction • Arousal Mechanism • Factors affecting sensory function • Assessment of Sensory alterations – sensory deficit, deprivation, overload & sensory poverty • Management oPromoting meaningful communication (patients with Aphasia, artificial airway & Visual and Hearing impairment) **Care of Unconscious Patients** • Unconsciousness: Definition, causes & risk factors, pathophysiology, stages of Unconsciousness, Clinical Manifestations • Assessment and nursing management of patient with unconsciousness, complications	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

XI	4 (T) 6 (SL)	Explain loss, death and grief	**Care of Terminally ill, death and dying** • Loss – Types • Grief, Bereavement & Mourning • Types of Grief responses • Manifestations of Grief • Factors influencing Loss & Grief Responses • Theories of Grief & Loss – Kubler Ross • 5 Stages of Dying • The R Process model (Rando's) • Death – Definition, Meaning, Types (Brain & Circulatory Deaths) • Signs of Impending Death • Dying patient's Bill of Rights • Care of Dying Patient • Physiological changes occurring after Death • Death Declaration, Certification • Autopsy • Embalming • Last office/Death Care • Counseling & supporting grieving relatives • Placing body in the Mortuary • Releasing body from Mortuary • Overview – Medico-legal Cases, Advance directives, DNI/DNR, Organ Donation, Euthanasia	• Lecture • Discussion • Case discussions • Death care/last office	• Essay • Short answer • Objective type
			PSYCHOSOCIAL NEEDS (A-D)		
XII	3 (T)	Develop basic understanding of self-concept	**A. Self-concept** • Introduction • Components (Personal Identity, Body Image, Role Performance, Self Esteem) • Factors affecting Self Concept • Nursing Management	• Lecture • Discussion • Demonstration • Case Discussion/ Role play	• Essay • Short answer • Objective type

XIII	2 (T)	Describe sexual development and sexuality	**B. Sexuality** • Sexual development throughout life • Sexual health • Sexual orientation • Factors affecting sexuality • Prevention of STIs, unwanted pregnancy, avoiding sexual harassment and abuse • Dealing with inappropriate sexual behavior	• Lecture • Discussion	• Essay • Short answer • Objective type
XIV	2 (T) 4 (SL)	Describe stress and adaptation	**C. Stress and Adaptation – Introductory concepts** • Introduction • Sources, Effects, Indicators & Types of Stress • Types of stressors • Stress Adaptation – General Adaptation Syndrome (GAS), Local Adaptation Syndrome (LAS) • Manifestation of stress – Physical & psychological • Coping strategies/ Mechanisms • Stress Management ○ Assist with coping and adaptation ○ Creating therapeutic environment • Recreational and diversion therapies	• Lecture • Discussion	• Essay • Short answer • Objective type

XV	6 (T)	Explain culture and cultural norms Integrate cultural differences and spiritual needs in providing care to patients under supervision	**D. Concepts of Cultural Diversity and Spirituality** • Cultural diversity ○ Cultural Concepts – Culture, Subculture, Multicultural, Diversity, Race, Acculturation, Assimilation ○ Transcultural Nursing ○ Cultural Competence ○ Providing Culturally Responsive Care • Spirituality ○ Concepts – Faith, Hope, Religion, Spirituality, Spiritual Wellbeing ○ Factors affecting Spirituality ○ Spiritual Problems in Acute, Chronic, Terminal illnesses & Near-Death Experience ○ Dealing with Spiritual Distress/Problems	• Lecture • Discussion	• Essay • Short answer • Objective type
XVI	6 (T)	Explain the significance of nursing theories	**Nursing Theories: Introduction** • Meaning &Definition, Purposes, Types of theories with examples, Overview of selected nursing theories – Nightingale, Orem, Roy • Use of theories in nursing practice	• Lecture • Discussion	• Essay • Short answer • Objective type

CLINICAL PRACTICUM

Clinical: 4 Credits (320 hours)

PRACTICE COMPETENCIES: On completion of the course, the student will be able to

1. Perform health assessment of each body system
2. Develop skills in assessment, planning, implementation and evaluation of nursing care using Nursing process approach
3. Identify and meet the Nutritional needs of patients
4. Implement basic nursing techniques in meeting hygienic needs of patients
5. Plan and Implement care to meet the elimination needs of patient
6. Develop skills in instructing and collecting samples for investigation.
7. Perform simple lab tests and analyze & interpret common diagnostic values
8. Identify patients with impaired oxygenation and demonstrate skill in caring for patients with impaired oxygenation
9. Identify and demonstrate skill in caring for patients with fluid, electrolyte and acid – base imbalances
10. Assess, plan, implement & evaluate the basic care needs of patients with altered functioning of sense organs and unconsciousness
11. Care for terminally ill and dying patients

SKILL LAB

Use of Mannequins and Simulators

S.No.	Competencies	Mode of Teaching
1.	Health Assessment	Standardized Patient
2.	Nutritional Assessment	Standardized Patient
3.	Sponge bath, oral hygiene, perineal care	Mannequin
4.	Nasogastric tube feeding	Trainer/ Simulator
5.	Providing bed pan & urinal	Mannequin
6.	Catheter care	Catheterization Trainer
7.	Bowel wash, enema, insertion of	Simulator/ Mannequin
8.	Oxygen administration – face mask, venture mask, nasal prongs	Mannequin
9.	Administration of medication through Parenteral route – IM,	IM injection trainer, ID injection trainer, IV arm (Trainer)
10.	Last Office	Mannequin

CLINICAL POSTINGS – General Medical/Surgical Wards
(16 weeks × 20 hours per week = 320 hours)

Clinical Unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
General Medical/ Surgical wards	3	Perform health assessment of each body system	**Health Assessment** • Nursing/Health history taking • Perform physical examination: oGeneral oBody systems • Use various methods of physical examination – Inspection, Palpation, Percussion, Auscultation, Olfaction • Identification of system wise deviations Documentation of findings	• History Taking – 2 • Physical examination – 2	• Assessment of clinical skills using checklist • OSCE
	1	Develop skills in assessment, planning, implementation and evaluation of nursing care using Nursing process approach	**The Nursing Process** • Prepare Nursing care plan for the patient based on the given case scenario	• Nursing process – 1	• Evaluation of Nursing process with criteria
		Identify and meet the Nutritional needs of patients	**Nutritional needs, Elimination needs& Diagnostic testing** *Nutritional needs* • Nutritional Assessment • Preparation of Nasogastric tube feed • Nasogastric tube feeding *Hygiene*	• Nutritional Assessment and Clinical Presentation – 1	• Assessment of clinical skills using checklist • OSCE

	2	Implement basic nursing techniques in meeting hygienic needs of patients	• Care of Skin & Hair: – Sponge Bath/ Bed bath – Care of pressure points & back massage • Pressure sore risk assessment using Braden/Norton scale – Hair wash – Pediculosis treatment • Oral Hygiene • Perineal Hygiene • Catheter care	• Pressure sore assessment – 1	
	2	Plan and Implement care to meet the elimination needs of patient Develop skills in	**Elimination needs** • Providing – Urinal – Bedpan • Insertion of Suppository • Enema • Urinary Catheter care • Care of urinary drainage **Diagnostic testing**	• Clinical Presentation on Care of patient with Constipation – 1 • Lab values – interpretation	• Assessment of clinical skills using checklist • OSCE
		Perform simple lab tests and analyze & interpret common diagnostic values	• Specimen Collection o Urine routine and culture oStool routine oSputum Culture • Perform simple Lab Tests using reagent strips o Urine – Glucose, Albumin, Acetone, pH, Specific gravity • Blood – GRBS Monitoring		

	3	Identify patients with impaired oxygenation and demonstrate skill in caring for patients with impaired oxygenation Identify and demonstrate skill in caring for patients with fluid, electrolyte and acid – base imbalances	**Oxygenation needs, Fluid, Electrolyte, and Acid – Base Balances** ***Oxygenation needs*** • Oxygen administration methods o Nasal Prongs o Face Mask/Venturi Mask • Steam inhalation • Chest Physiotherapy • Deep Breathing & Coughing Exercises • Oral Suctioning ***Fluid, Electrolyte, and Acid – Base Balances*** • Maintaining intake output chart • Identify & report complications of IV therapy • Observe Blood & Blood Component therapy		• Assessment of clinical skills using checklist • OSCE • Assessment of clinical skills using checklist • OSCE
	3	Explain the principles, routes, effects of administration of medications Calculate conversions of drugs and dosages within and between systems of Measurements Administer drugs by the following routes- Oral, Intradermal, Subcutaneous, Intramuscular, Intra Venous Topical, inhalation	**Administration of Medications** Calculate Drug Dosages Preparation of lotions & solutions Administer Medications Oral Topical Inhalations Parenteral ▪ Intradermal ▪ Subcutaneous ▪ Intramuscular Instillations ▪ Eye, Ear, Nose – instillation of medicated drops, nasal sprays, irrigations		• Assessment of clinical skills using checklist • OSCE

	2	Assess, plan, implement & evaluate the basic care needs of patients with altered functioning of sense organs and unconsciousness Care for terminally ill and dying patients	**Sensory Needs and Care of Unconscious patients, Care of Terminally ill, death and dying** *Sensory Needs and Care of Unconscious patients* • Assessment of Level of Consciousness using Glasgow Coma Scale *Terminally ill, death and dying* • Death Care	• Nursing rounds on care of patient with altered sensorium	• Assessment of clinical skills using checklist • OSCE • Assessment of clinical skills using checklist

HEALTH/NURSING INFORMATICS AND TECHNOLOGY

PLACEMENT: II SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICAL/LAB: 1 Credit (40 hours)

COURSE CODE: HNIT 145

DESCRIPTION: This course is designed to equip novice nursing students with knowledge and skills necessary to deliver efficient informatics-led health care services.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop a basic understanding of computer application in patient care and nursing practice.
2. Apply the knowledge of computer and information technology in patient care and nursing education, practice, administration and research.
3. Describe the principles of health informatics and its use in developing efficient healthcare.
4. Demonstrate the use of information system in healthcare for patient care and utilization of nursing data.
5. Demonstrate the knowledge of using Electronic Health Records (EHR) system in clinical practice.
6. Apply the knowledge of interoperability standards in clinical setting.
7. Apply the knowledge of information and communication technology in public health promotion.
8. Utilize the functionalities of Nursing Information System (NIS) system in nursing.
9. Demonstrate the skills of using data in management of health care.
10. Apply the knowledge of the principles of digital ethical and legal issues in clinical practice.
11. Utilize evidence-based practices in informatics and technology for providing quality patient care.
12. Update and utilize evidence-based practices in nursing education, administration, and practice.

COURSE OUTLINE

T – Theory, P/L – Lab

Unit	Time		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P/L				
I	10	15	Describe the importance of computer and technology in patient care and nursing practice	**Introduction to computer applications for patient care delivery system and nursing practice** Use of computers in teaching, learning, research and nursing practice	• Lecture • Discussion • Practice session • Supervised clinical practice on EHR use • Participate in data analysis using statistical package with statistician	(T) • Short answer • Objective type • Visit reports • Assessment of assignments
			Demonstrate the use of computer and technology in patient care, nursing education, practice, administration and research.	• Windows, MS office: Word, Excel, Power Point • Internet • Literature search • Statistical packages • Hospital management information system	• Visit to hospitals with different hospital management systems	(P) • Assessment of skills using checklist
II	4	5	Describe the principles of health informatics Explain the ways data, knowledge and information can be used for effective healthcare	**Principles of Health Informatics** • Health informatics – needs, objectives and limitations • Use of data, information and knowledge for more effective healthcare and better health	• Lecture • Discussion • Practical session • Work in groups with health informatics team in a hospital to extract nursing data and prepare a report	(T) • Essay • Short answer • Objective type questions • Assessment of report
III	3	5	Describe the concepts of information system in health Demonstrate the use of health information system in hospital setting	**Information Systems in Healthcare** • Introduction to the role and architecture of information systems in modern healthcare environments • Clinical Information System (CIS)/Hospital information System (HIS)	• Lecture • Discussion • Demonstration • Practical session • Work in groups with nurse leaders to understand the hospital information system	(T) • Essay • Short answer • Objective type

IV	4	4	Explain the use of electronic health records in nursing practice Describe the latest trend in electronic health records standards and interoperability	**Shared Care & Electronic Health Records** • Challenges of capturing rich patient histories in a computable form • Latest global developments and standards to enable lifelong electronic health records to be integrated from disparate systems.	• Lecture • Discussion • Practice on Simulated EHR system • Practical session • Visit to health informatics department of a hospital to understand the use of EHR in nursing practice • Prepare a report on current EHR standards in Indian setting	(T) • Essay • Short answer • Objective type (P) • Assessment of skills using checklist
V	3		Describe the advantages and limitations of health informatics in maintaining patient safety and risk management	**Patient Safety & Clinical Risk** • Relationship between patient safety and informatics • Function and application of the risk management process	• Lecture • Discussion	(T) • Essay • Short answer • Objective type
VI	3	6	Explain the importance of knowledge manageme nt Describe the standardized languages used in health informatics	**Clinical Knowledge & Decision Making** • Role of knowledge management in improving decision-making in both the clinical and policy contexts • Systematized Nomenclature of Medicine, Clinical Terms, SNOMED CT to ICD-10-CM Map, standardized nursing terminologies (NANDA, NOC), Omaha system.	• Lecture • Discussion • Demonstration • Practical session • Work in groups to prepare a report on standardized languages used in health informatics. • Visit health informatics department to understand the standardized languages used in hospital setting	(T) • Essay • Short answer • Objective type

VII	3		Explain the use of information and communication technology in patient care Explain the application of public health informatics	**eHealth: Patients and the Internet** • Use of information and communication technology to improve or enable personal and public healthcare • Introduction to public health informatics and role of nurses	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • Practical exam
VIII	3	5	Describe the functions of nursing information system Explain the use of healthcare data in management of health care organization	**Using Information in Healthcare Management** • Components of Nursing Information system(NIS) • Evaluation, analysis and presentation of healthcare data to inform decisions in the management of health-care organizations	• Lecture • Discussion • Demonstration on simulated NIS software • Visit to health informatics department of the hospital to understand use of healthcare data in decision making	(T) • Essay • Short answer • Objective type
IX	4		Describe the ethical and legal issues in healthcare informatics Explains the ethical and legal issues related to nursing informatics	**Information Law & Governance in Clinical Practice** • Ethical-legal issues pertaining to healthcare information in contemporary clinical practice • Ethical-legal issues related to digital health applied to nursing	• Lecture • Discussion • Case discussion • Role play	(T) • Essay • Short answer • Objective type
X	3		Explain the relevance of evidence-based practices in providing quality healthcare	**Healthcare Quality & Evidence Based Practice** • Use of scientific evidence in improving the quality of healthcare and technical and professional informatics standards	• Lecture • Discussion • Case study	(T) • Essay • Short answer • Objective type

SKILLS

- Utilize computer in improving various aspects of nursing practice.
- Use technology in patient care and professional advancement.
- Use data in professional development and efficient patient care.
- Use information system in providing quality patient care.
- Use the information system to extract nursing data.
- Develop skill in conducting literature review.

SYLLABUS

III SEMESTER

B.Sc. NURSING

APPLIED MICROBIOLOGY AND INFECTION CONTROL INCLUDING SAFETY

PLACEMENT: III SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICAL: 1 Credit (40 hours) (Lab/Experiential Learning – L/E)

COURSE CODE: MICR 201

SECTION A: APPLIED MICROBIOLOGY

THEORY: 20 hours

PRACTICAL: 20 hours (Lab/Experiential Learning – L/E)

DESCRIPTION: This course is designed to enable students to acquire understanding of fundamentals of Microbiology, compare and contrast different microbes and comprehend the means of transmission and control of spread by various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

COMPETENCIES: On completion of the course, the students will be able to:

1. Identify the ubiquity and diversity of microorganisms in the human body and the environment.
2. Classify and explain the morphology and growth of microbes.
3. Identify various types of microorganisms.
4. Explore mechanisms by which microorganisms cause disease.
5. Develop understanding of how the human immune system counteracts infection by specific and non-specific mechanisms.
6. Apply the principles of preparation and use of vaccines in immunization.
7. Identify the contribution of the microbiologist and the microbiology laboratory to the diagnosis of infection.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	3		Explain concepts and principles of microbiology and its importance in nursing	**Introduction:** • Importance and relevance to nursing • Historical perspective • Concepts and terminology • Principles of microbiology	• Lecture cum Discussion	• Short answer • Objective type
II	10	10 (L/E)	Describe structure, classification morphology and growth of bacteria Identify Microorganisms	**General characteristics of Microbes:** • Structure and classification of Microbes • Morphological types • Size and form of bacteria • Motility • Colonization • Growth and nutrition of microbes • Temperature • Moisture • Blood and body fluids • Laboratory methods for Identification of Microorganisms • Types of Staining – simple, differential (Gram's, AFB), special – capsular staining (negative), spore, LPCB, KOH mount. • Culture and media preparation – solid and liquid. Types of media – semi synthetic, synthetic, enriched, enrichment, selective and differential media. Pure culture techniques – tube dilution, pour, spread, streak plate. Anaerobic cultivation of bacteria	• Lecture cum Discussion • Demonstration • Experiential Learning through visual	• Short answer • Objective type

III	4	6 (L/E)	Describe the different disease producing organisms	**Pathogenic organisms** • Micro-organisms: Cocci – gram positive and gram negative; Bacilli – gram positive and gram negative • Viruses • Fungi: Superficial and Deep mycoses • Parasites • Rodents & Vectors o Characteristics, Source, portal of entry, transmission of infection, Identification of disease producing micro-organisms	• Lecture cum Discussion • Demonstration • Experiential learning through visual	• Short answer • Objective type
IV	3	4 (L/E)	Explain the concepts of immunity, hyper sensitivity and immunization	**Immunity** • Immunity: Types, classification • Antigen and antibody reaction • Hypersensitivity reactions • Serological tests • Immunoglobulins: Structure, types & properties • Vaccines: Types & classification, storage and handling, cold chain, Immunization for various diseases • Immunization Schedule	• Lecture • Discussion • Demonstration • Visit to observe vaccine storage • Clinical practice	• Short answer • Objective type • Visit report

SECTION B: INFECTION CONTROL & SAFETY

THEORY:
20 hours

PRACTICAL/LAB: 20 hours (Lab/Experiential Learning – L/E)

COURSE DESCRIPTION: This course is designed to help students to acquire knowledge and develop competencies required for fundamental patient safety and infection control in delivering patient care. It also focuses on identifying patient safety indicators, preventing and managing hospital acquired infections, and in following universal precautions.

COMPETENCIES: The students will be able to:

1. Develop knowledge and understanding of Hospital acquired Infections (HAI) and effective practices for prevention.
2. Integrate the knowledge of isolation (Barrier and reverse barrier) techniques in implementing various precautions.
3. Demonstrate and practice steps in Hand washing and appropriate use of different types of PPE.
4. Illustrate various disinfection and sterilization methods and techniques.
5. Demonstrate knowledge and skill in specimen collection, handling and transport to optimize the diagnosis for treatment.
6. Incorporate the principles and guidelines of Bio Medical waste management.
7. Apply the principles of Antibiotic stewardship in performing the nurses'role.
8. Identify patient safety indicators and perform the role of nurse in the patient safety audit process.
9. Apply the knowledge of International Patient Safety Goals (IPSG) in the patient care settings.
10. Identify employee safety indicators and risk of occupational hazards.
11. Develop understanding of the various safety protocols and adhere to those protocols.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	2	2 (E)	Summarize the evidence based and effective patient care practices for the prevention of common healthcare associated infections in the healthcare setting	**HAI (Hospital acquired Infection)** • Hospital acquired infection • Bundle approach - Prevention of Urinary Tract Infection (UTI) - Prevention of Surgical Site Infection (SSI) Prevention of Ventilator Associated events (VAE)	• Lecture & Discussion • Experiential learning	• Knowledge assessment • MCQ • Short answer

				- Prevention of Central Line Associated Blood Stream Infection (CLABSI) • Surveillance of HAI – Infection control team & Infection control committee		
II	3	4 (L)	Demonstrate appropriate use of different types of PPEs and the critical use of risk assessment	**Isolation Precautions and use of Personal Protective Equipment (PPE)** • Types of isolation system, standard precaution and transmission-based precautions (Direct Contact, Droplet, Indirect) • Epidemiology & Infection prevention – CDC guidelines • Effective use of PPE	• Lecture • Demonstration & Re-demonstration	• Performance assessment • OSCE
III	1	2 (L)	Demonstrate the hand hygiene practice and its effectiveness on infection control	**Hand Hygiene** • Types of Hand hygiene. • Hand washing and use of alcohol hand rub • Moments of Hand Hygiene • WHO hand hygiene promotion	• Lecture • Demonstration & Re-demonstration	• Performance assessment
IV	1	2 (E)	Illustrates disinfection and sterilization in the healthcare setting	**Disinfection and sterilization** • Definitions • Types of disinfection and sterilization • Environment cleaning • Equipment Cleaning • Guides on use of disinfectants • Spaulding ‘s principle	• Lecture • Discussion • Experiential learning through visit	• Short answer • Objective type

V	1		Illustrate on what, when, how, why specimens are collected to optimize the diagnosis for treatment and management .	**Specimen Collection (Review)** • Principle of specimen collection • Types of specimens • Collection techniques and special considerations • Appropriate containers • Transportation of the sample • Staff precautions in handling specimens	• Discussion	• Knowledge evaluation • Quiz • Performance assessment • Checklist
VI	2	2 (E)	Explain on Bio Medical waste management & laundry management	**BMW (Bio Medical Waste Management)** • Laundry management process and infection control and prevention • Waste management process and infection prevention • Staff precautions • Laundry management • Country ordinance and BMW National guidelines 2017: Segregation of wastes, Colour coded waste containers, waste collection & storage, Packaging & labeling, Transportation	• Discussion • Demonstration • Experiential learning through	• Knowledge assessment by short answers, objective type • Performance
VII	2		Explain in detail about Antibiotic stewardship, AMR Describe MRSA/ MDRO and its prevention	**Antibiotic stewardship** • Importance of Antibiotic Stewardship • Anti-Microbial Resistance • Prevention of MRSA, MDRO in healthcare setting	• Lecture • Discussion • Written assignment –Recent AMR (Antimicrobial resistance) guidelines	• Short answer • Objective type • Assessment of assignment

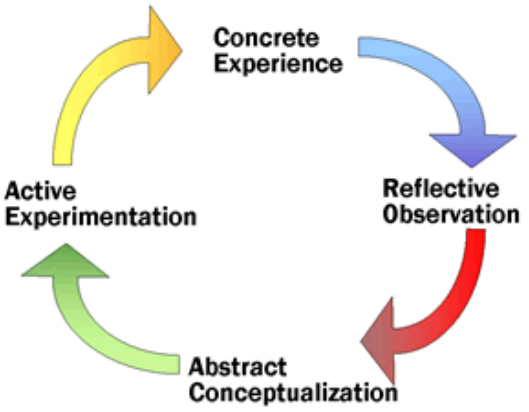
VIII	3	5 (L/E)	Enlist the patient safety indicators followed in a health care organization and the role of nurse in the patient safety audit process	**Patient Safety Indicators** • Care of Vulnerable patients • Prevention of Iatrogenic injury • Care of lines, drains and tubing's • Restrain policy and care – Physical and Chemical • Blood & blood transfusion policy • Prevention of IV Complication • Prevention of Fall • Prevention of DVT • Shifting and transporting of patients • Surgical safety • Care coordination event related to medication reconciliation and administration • Prevention of communication errors • Prevention of HAI • Documentation	• Lecture • Demonstration • Experiential learning	• Knowledge assessment • Performance assessment • Checklist/ OSCE
			Captures and analyzes incidents and events for quality improvement	**Incidents and adverse Events** • Capturing of incidents • RCA (Root Cause Analysis) • CAPA (Corrective and Preventive Action) • Report writing	• Lecture • Role play • Inquiry Based Learning	• Knowledge assessment • Short answer • Objective type

IX	1		Enumerate IPSG and application of the goals in the patient care settings.	**IPSG (International Patient safety Goals)** • Identify patient correctly • Improve effective communication • Improve safety of High Alert medication • Ensure safe surgery • Reduce the risk of health care associated infection • Reduce the risk of patient harm resulting from falls	• Lecture • Role play	• Objective type
X	2	3 (L/E)	Enumerate the various safety protocols and its applications	**Safety protocol** • 5S (Sort, Set in order, Shine, Standardize, Sustain) • Radiation safety • Laser safety • Fire safety - Types and classification of fire - Fire alarms - Firefighting equipment • HAZMAT (Hazardous Materials) safety - Types of spill - Spillage management - MSDS (Material Safety Data Sheets) • Environmental safety - Risk assessment - Aspect impact analysis - Maintenance of Temp and Humidity (Department wise) - Audits • Emergency Codes • Role of Nurse in times of disaster	• Lecture • Demonstration/ Experiential learning	• Mock drills • Post tests • Checklist

XI	2		Explain importance of employee safety indicators Identify risk of occupational hazards, prevention and post exposure prophylaxis	**Employee Safety Indicators** • Vaccination • Needle stick injuries (NSI) prevention • Fall prevention • Radiation safety • Annual health check **Healthcare Worker Immunization Program and management of occupational exposure** • Occupational health ordinance • Vaccination program for healthcare staff	• Lecture • Discussion • Lecture method • Journal review	• Knowledge assessment by short answers, • objective type • Short answer

***Experiential Learning:**

Experiential learning is the process by which knowledge is created through the process of experience in the clinical field. Knowledge results from the combination of grasping and transforming experience. (Kolb,1984). The experiential learning cycle begins with an experience that the student has had, followed by an opportunity to reflect on that experience. Then students may conceptualize and draw conclusions about what they experienced and observed, leading to future actions in which the students experiment with different behaviors. This begins the new cycle as the students have new experiences based on their experimentation. These steps may occur in nearly and order as the learning progresses. As per the need of the learner, the concrete components and conceptual components can be in different order as they may require a variety of cognitive and affective behavi



Kolb's Cycle of Experiential Learning

PHARMACOLOGY - I

PLACEMENT: III SEMESTER

THEORY: 1 Credit (20 hours)

COURSE CODE: PHAR (1) 205

COURSE DESCRIPTION: This course is designed to enable students to acquire understanding of Pharmacodynamics, Pharmacokinetics, principles of therapeutics and nursing implications.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe pharmacodynamics and pharmacokinetics.
2. Review the principles of drug calculation and administration.
3. Explain the commonly used antiseptics and disinfectants.
4. Describe the pharmacology of drugs acting on the GI system.
5. Describe the pharmacology of drugs acting on the respiratory system.
6. Describe drugs used in the treatment of cardiovascular and blood disorders.
7. Explain the drugs used in the treatment of endocrine system disorders.
8. Describe the drugs acting on skin and drugs used to treat communicable diseases

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	3 (T)	Describe Pharmacodynamics, Pharmacokinetics, Classification, principles of administration of drugs	**Introduction to Pharmacology** • Definitions & Branches • Nature & Sources of drugs • Dosage Forms and Routes of drug administration • Terminology used • Classification, Abbreviations, Prescription, Drug Calculation, Weights and Measures • *Pharmacodynamics:* Actions, Drug Antagonism, Synergism, Tolerance, Receptors, Therapeutic, adverse, toxic effects, pharmacovigilance • *Pharmacokinetics:* Absorption, Bioavailability, Distribution, Metabolism, Interaction, Excretion • Review: Principles of drug administration and treatment individualization o Factors affecting dose, route etc. • Indian Pharmacopoeia: Legal Issues, Drug Laws, Schedule Drugs • Rational Use of Drugs • Principles of Therapeutics	• Lecture cum Discussion • Guided reading and written assignment on schedule K drugs	• Short answer • Objective type • Assessment of assignments
II	1 (T)	Describe antiseptics, and disinfectant & nurse's responsibilities	**Pharmacology of commonly used antiseptics and disinfectants** • Antiseptics and Disinfectants • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

III	2 (T)	Describe drugs acting on gastro-intestinal system & nurse's responsibilities	**Drugs acting on G.I. system** • Pharmacology of commonly used drugs ○ Emetics and Antiemetics ○ Laxatives and Purgatives ○ Antacids and antipeptic ulcer drugs ○ Anti-diarrhoeals – Fluid and electrolyte therapy, Furazolidone, dicyclomine • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
IV	2 (T)	Describe drugs acting on respiratory system & nurse's responsibilities	**Drugs acting on respiratory system** • Pharmacology of commonly used ○ Antiasthmatics – Bronchodilators (Salbutamol inhalers) ○ Decongestants ○ Expectorants, Antitussives and Mucolytics ○ Broncho-constrictors and Antihistamines • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

V	4 (T)	Describe drugs used on cardio-vascular system & nurse's responsibilities	**Drugs used in treatment of Cardiovascular system and blood disorders** • Hematinic, & treatment of anemia and antiadrenergic • Cholinergic and anticholinergic • Adrenergic Drugs for CHF & vasodilators • Antianginals • Antiarrhythmics • Antihypertensives • Coagulants & Anticoagulants • Antiplatelets & thrombolytics • Hypolipidemics • Plasma expanders & treatment of shock • Drugs used to treat blood disorders • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VI	2 (T)	Describe the drugs used in treatment of endocrine system disorders	**Drugs used in treatment of endocrine system disorders** • Insulin & oral hypoglycemics • Thyroid and anti-thyroid drugs • Steroids oCorticosteroids oAnabolic steroids • Calcitonin, parathormone, vitamin D3, calcium metabolism oCalcium salts	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

VII	1 (T)	Describe drugs used in skin diseases & nurse's responsibilities	**Drugs used in treatment of integumentary system** • Antihistaminics and antipruritics • Topical applications for skin- Benzylbenzoate, Gamma BHC, Clotrimazole, Miconazole, Silver Sulphadiazine (burns) • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VIII	5 (T)	Explain drug therapy/ chemotherapy of specific infections & infestations & nurse's responsibilities	**Drugs used in treatment of communicable diseases (common infections, infestations)** • General Principles for use of Antimicrobials • Pharmacology of commonly used drugs: oPenicillin, Cephalosporin's, Aminoglycosides, Macrolide & broad spectrum antibiotics, Sulfonamides, quinolones, Misc. antimicrobials • Anaerobic infections • Antitubercular drugs, • Antileprosy drugs • Antimalarials • Antiretroviral drugs • Antiviral agents • Antihelminthics, Antiscabies agents • Antifungal agents • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

PATHOLOGY - I

PLACEMENT: III SEMESTER

THEORY: 1 Credit (20 hours) (includes lab hours also)

COURSE CODE: PATH (I) 210

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology.
2. Rationalize the various laboratory investigations in diagnosing pathological disorders.
3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests.
4. Apply the knowledge of genetics in understanding the various pathological disorders.
5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities.
6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.
7. Demonstrate the understanding of various services related to genetics

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Define the common terms used in pathology Identify the deviations from normal to abnormal structure and functions of body system	**Introduction** • Importance of the study of pathology • Definition of terms in pathology • Cell injury: Etiology, pathogenesis of reversible and irreversible cell injury, Necrosis, Gangrene • Cellular adaptations: Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia, Apoptosis • Inflammation: o Acute inflammation (Vascular and Cellular events, systemic effects of acute inflammation) o Chronic inflammation (Granulomatous inflammation, systemic effects of chronic inflammation) • Wound healing • Neoplasia**:** Nomenclature, Normal and Cancer cell, Benign and malignant tumors, Carcinoma in situ, Tumor metastasis: general mechanism, routes of spread and examples of each route • Circulatory disturbances: Thrombosis, embolism, shock • Disturbance of body fluids and electrolytes: Edema, Transudates and Exudates	• Lecture • Discussion • Explain using slides • Explain with clinical scenarios	• Short answer • Objective type
II	5 (T)	Explain pathological changes in disease conditions of various systems	**Special Pathology** **Pathological changes in disease conditions of selected systems:** **1. Respiratory system** • Pulmonary infections: Pneumonia, Lung abscess, pulmonary tuberculosis • Chronic Obstructive Pulmonary Disease: Chronic bronchitis, Emphysema, Bronchial Asthma, Bronchiectasis • Tumors of Lungs	• Lecture • Discussion • Explain using slides, X-rays and scans • Visit to pathology lab, endoscopy unit and OT	• Short answer • Objective type

			• **Cardio-vascular system**
			• Atherosclerosis
			• Ischemia and Infarction.
			• Rheumatic Heart Disease
			• Infective endocarditis
			• **Gastrointestinal tract**
			  • Peptic ulcer disease (Gastric and Duodenal ulcer)
			  • Gastritis-H Pylori infection
			  • Oral mucosa: Oral Leukoplakia, Squamous cell carcinoma
			  • Esophageal cancer
			  • Gastric cancer
			  • Intestinal: Typhoid ulcer, Inflammatory Bowel Disease (Crohn's disease and Ulcerative colitis), Colorectal cancer
			• **Liver, Gall Bladder and Pancreas**
			  • Liver: Hepatitis, Amoebic Liver abscess, Cirrhosis of Liver
			  • Gall bladder: Cholecystitis.
			  • Pancreas: Pancreatitis
			  • Tumors of liver, Gall bladder and Pancreas
			• **Skeletal system**
			  • Bone: Bone healing, Osteoporosis, Osteomyelitis, Tumors
			  • Joints: Arthritis - Rheumatoid arthritis and Osteoarthritis
			• **Endocrine system**
			  • Diabetes Mellitus
			  • Goitre
			  • Carcinoma thyroid		

III	7 (T)	Describe various laboratory tests in assessment and monitoring of disease conditions	**Hematological tests for the diagnosis of blood disorders** • Blood tests: Hemoglobin, White cell and platelet counts, PCV, ESR • Coagulation tests: Bleeding time (BT), Prothrombin time (PT), Activated Partial Prothrombin Time (APTT) • Blood chemistry • Blood bank: o Blood grouping and cross matching o Blood components o Plasmapheresis o Transfusion reactions **Note:** Few lab hours can be planned for observation and visits (Less than 1 credit, lab hours are not specified separately)	• Lecture • Discussion • Visit to clinical lab, biochemistry lab and blood bank	• Short answer • Objective type

ADULT HEALTH NURSING - I

WITH INTEGRATED PATHOPHYSIOLOGY (Including BCLS Module)

PLACEMENT: III SEMESTER

THEORY: 7 Credits (140 hours)

PRACTICUM: Lab/Skill Lab (SL) – 1 Credit (40 hours) Clinical – 6 Credits (480 hours)

COURSE CODE: N-AHN (I) 215

COURSE DESCRIPTION: This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach and critical thinking. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative care to patients with various Medical Surgical disorders.

COMPETENCIES: On completion of Medical Surgical Nursing I course, students will be able to

1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of common medical and surgical disorders.
2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of anatomy, physiology and diagnostic tests in the process of data collection.
3. Identify nursing diagnoses, list them according to priority and formulate nursing care plan.
4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.
5. Integrate knowledge of pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.
6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.
7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.
8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.
9. Identify the drugs used in treating patients with medical surgical conditions.
10. Plan and give relevant individual and group education on significant medical surgical topics.
11. Maintain safe environment for patients and the health care personnel in the hospital.
12. Integrate evidence-based information while giving nursing care to patients.

COURSE CONTENT

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	6 (T) 4 (L/SL)	Narrate the evolution of medical surgical nursing Apply nursing process in caring for patients with medical surgical problems Execute the role of a nurse in various medical surgical setting Develop skills in assessment and care of wound Develop competency in providing pre and postoperative care	**Introduction** • Evolution and trends of medical and surgical nursing • International classification of diseases • Roles and responsibility of a nurse in medical and surgical settings o Outpatient department o In-patient unit o Intensive care unit • Introduction to medical and surgical asepsis o Inflammation, infection o Wound healing – stages, influencing factors o Wound care and dressing technique • Care of surgical patient opre-operative opost-operative o Alternative therapies used in caring for patients with Medical Surgical Disorders	• Lecture cum discussion • Demonstration & Practice session • Role play • Visit to outpatient department, in patient and intensive care unit	• Short Answer • OSCE

II	15 (T) 4 (L/SL)	Explain organizational set up of the operating theatre Differentiate the role of scrub nurse and circulating nurse Describe the different positioning for various surgeries Apply principles of asepsis in handling the sterile equipment Demonstrate skill in scrubbing procedures Demonstrate skill in assessing the patient and document accurately the surgical safety checklist Develop skill in assisting with selected surgeries Explain the types, functions, and nursing considerations for different types of anesthesia	**Intraoperative Care** • Organization and physical set up of the operation theatre • Classification ○ O.T Design ○ Staffing ○ Members of the OT team ○ Duties and responsibilities of the nurse in OT • Position and draping for common surgical procedures • Instruments, sutures and suture materials, equipment for common surgical procedures • Disinfection and sterilization of equipment • Preparation of sets for common surgical procedures • Scrubbing procedures – Gowning, masking and gloving • Monitoring the patient during the procedures • Maintenance of the therapeutic environment in OT • Assisting in major and minor operation, handling specimen • Prevention of accidents and hazards in OT • Anesthesia – types, methods of administration, effects and stages, equipment & drugs • Legal aspects	• Lecture cum Discussio n • Demonstration, Practice session, and Case Discussion • Visit to receiving bay	• Caring for patient intra operativel y • Submit a list of disinfectants used for instruments with the action and precaution
III	6 (T) 4 (L/SL)	Identify the signs and symptoms of shock and electrolyte imbalances Develop skills in managing fluid and electrolyte imbalances	**Nursing care of patients with common signs and symptoms and management** • Fluid and electrolyte imbalance • Shock • Pain	• Lecture, discussion, demonstration • Case discussion	• Short answer • MCQ • Case report

		Perform pain assessment and plans for the nursing management			
IV	18 (T) 4 (L)	Demonstrate skill in respiratory assessment Differentiates different breath sounds and lists the indications Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of common respiratory problems Describe the health behaviour to be adopted in preventing respiratory illnesses	**Nursing Management of patients with respiratory problems** • Review of anatomy and physiology of respiratory system • Nursing Assessment – history taking, physical assessment and diagnostic tests • Common respiratory problems: ○ Upper respiratory tract infections ○ Chronic obstructive pulmonary diseases ○ Asthma ○ Pleural effusion, Empyema ○ Bronchiectasis ○ Pneumonia ○ Lung abscess ○ Cyst and tumors ○ Chest Injuries ○ Acute respiratory distress syndrome ○ Pulmonary embolism • Health behaviours to prevent respiratory illness	• Lecture, discussion, • Demonstration • Practice session • Case presentation • Visit to PFT Lab	• Essay • Short answer • OSCE

V	16 (T) 5 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of gastrointestinal disorders Demonstrate skill in gastrointestinal assessment Prepare patient for upper and lower gastrointestinal investigations Demonstrate skill in gastric decompression, gavage, and stoma care Demonstrate skill in different feeding techniques	**Nursing Management of patients with disorders of digestive system** • Review of anatomy and physiology of GI system • Nursing assessment –History and physical assessment • GI investigations • Common GI disorders: ○ Oral cavity: lips, gums and teeth ○ GI: Bleeding, Infections, Inflammation, tumors, Obstruction, Perforation & Peritonitis ○ Peptic & duodenal ulcer, ○ Mal-absorption, Appendicitis, Hernias ○ Hemorrhoids, fissures, Fistulas ○ Pancreas: inflammation, cysts, and tumors o Liver: inflammation, cysts, abscess, cirrhosis, portal hypertension, hepatic failure, tumors o Gall bladder: inflammation, Cholelithiasis, tumors • Gastric decompression, gavage and stoma care, different feeding techniques ○ Alternative therapies, drugs used in treatment of disorders of digestive system	• Lecture, Discussion • Demonstration, • Role play • Problem Based Learning • Visit to stoma clinic	• Short answer • Quiz • OSCE

VI	20 (T) 5 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of cardiovascular disorders Demonstrate skill in cardiovascular assessment Prepare patient for invasive and non- invasive cardiac procedures Demonstrate skill in monitoring and interpreting clinical signs related to cardiac disorders Complete BLS/BCLS module	**Nursing Management of patients with cardiovascular problems** • Review of anatomy and physiology of cardio-vascular system • Nursing Assessment: History and Physical assessment • Invasive & non-invasive cardiac procedures • Disorders of vascular system- Hypertension, arteriosclerosis, Raynaud's disease, aneurysm and peripheral vascular disorders • Coronary artery diseases: coronary atherosclerosis, Angina pectoris, myocardial infarction • Valvular disorders: congenital and acquired • Rheumatic heart disease: pericarditis, myocarditis, endocarditis, cardiomyopathies • Cardiac dysrhythmias, heart block • Congestive heart failure, corpulmonale, pulmonary edema, cardiogenic shock, cardiac tamponade • Cardiopulmonary arrest	• Lecture, discussion • Demonstration • Practice session • Case Discussion • Health education • Drug Book/ presentation • **Completion of BCLS Module**	• Care plan • Drug record • BLS/ BCLS evaluation
VII	7 (T) 3 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of hematological disorders Prepare and provides health education on blood donation Interpret blood reports	**Nursing Management of patients with disorders of blood** • Review of Anatomy and Physiology of blood • Nursing assessment: history, physical assessment & Diagnostic tests • Anemia, Polycythemia Bleeding Disorders: clotting factor defects and platelets defects, thalassemia, leukemia, leukopenia, agranulocytosis • Lymphomas, myelomas	• Field visit to blood bank • Counseling	• Interpretation of blood reports • Visit report

VIII	8 (T) 2 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of endocrine disorders Demonstrate skill in assessment of endocrine organ dysfunction Prepare and provides health education on diabetic diet Demonstrate skill in insulin administration	**Nursing management of patients with disorders of endocrine system** • Review of anatomy and physiology of endocrine system • Nursing Assessment – History and Physical assessment • Disorders of thyroid and Parathyroid, Adrenal and Pituitary (Hyper, Hypo, tumors) • Diabetes mellitus	• Lecture, discussion, demonstration • Practice session • Case Discussion • Health education	• Prepare health education on self-administration of insulin • Submits a diabetic diet plan
IX	8 (T) 2 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of disorders of integumentary system Demonstrate skill in integumentary assessment Demonstrate skill in medicated bath Prepare and provide health education on skin care	**Nursing management of patients with disorders of Integumentary system** • Review of anatomy and physiology of skin • Nursing Assessment: History and Physical assessment • Infection and infestations; Dermatitis • Dermatoses; infectious and Non-infectious • Acne, Allergies, Eczema & Pemphigus • Psoriasis, Malignant melanoma, Alopecia • Special therapies, alternative therapies • Drugs used in treatment of disorders of integumentary system	• Lecture, discussion • Demonstration • Practice session • Case Discussion	• Drug report • Preparation of Home care plan

X	16 (T) 4 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of musculoskeletal disorders Demonstrate skill in musculoskeletal assessment Prepare patient for radiological and non- radiological investigations of musculoskeletal system Demonstrate skill in crutch walking and splinting Demonstrate skill in care of patient with replacement surgeries Prepare and provide health education on bone healing	**Nursing management of patients with musculoskeletal problems** • Review of Anatomy and physiology of the musculoskeletal system • Nursing Assessment: History and physical assessment, diagnostic tests Musculoskeletal trauma: Dislocation, fracture, sprain, strain, contusion, amputation • Musculoskeletal infections and tumors: Osteomyelitis, benign and malignant tumour • Orthopedic modalities: Cast, splint, traction, crutch walking • Musculoskeletal inflammation: Bursitis, synovitis, arthritis • Special therapies, alternative therapies • Metabolic bone disorder: Osteoporosis, osteomalacia and Paget's disease • Spinal column defects and deformities – tumor, prolapsed intervertebral disc, Pott's spine • Rehabilitation, prosthesis • Replacement surgeries	• Lecture/ • Discussion • Demonstration • Case Discussion • Health education	• Nursing care plan • Prepare health teaching on care of patient with cast

XI	20 (T) 3 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of patients with communicable diseases Demonstrate skill in barrier and reverse barrier techniques Demonstrate skill in execution of different isolation protocols	**Nursing management of patients with Communicable diseases** • Overview of infectious diseases, the infectious process • Nursing Assessment: History and Physical assessment, Diagnostic tests • Tuberculosis • Diarrhoeal diseases, hepatitis A- E, Typhoid • Herpes, chickenpox, Smallpox, Measles, Mumps, Influenza • Meningitis • Gas gangrene • Leprosy • Dengue, Plague, Malaria, Chikungunya, swine flu, Filariasis • Diphtheria, Pertussis, Tetanus, Poliomyelitis • COVID-19 • Special infection control measures: Notification, Isolation, Quarantine, Immunization	• Lecture, discussion, demonstration • Practice session • Case Discussion/ seminar • Health education • Drug Book/ presentation • **Refer TB Control** • **& Management module**	• Prepares and submits protocol on various isolation techniques

CLINICAL PRACTICUM

CLINICAL PRACTICUM: 6 Credits (480 hours) - 18 weeks × 27 hours

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will be able to apply nursing process and critical thinking in delivering holistic nursing care including rehabilitation to the adult patients undergoing surgery, with shock and fluid and electrolyte imbalance and with selected medical & surgical conditions i.e., Gastrointestinal, Respiratory, Endocrine, Orthopedic, Dermatology and Cardiovascular disorders.

The students will be competent to:

1. Utilize the nursing process in providing care to the sick adults in the hospital:
    a. Perform complete health assessment to establish a data base for providing quality patient care.
    b. Integrate the knowledge of diagnostic tests in the process of data collection.
    c. Identify nursing diagnoses and list them according to priority.
    d. Formulate nursing care plan, using problem solving approach.
    e. Apply scientific principles while giving nursing care to patients.
    f. Perform nursing procedures skillfully on patients.
    g. Establish/develop interpersonal relationship with patients and family members.
    h. Evaluate the expected outcomes and modify the plan according to the patient needs.
2. Provide comfort and safety to adult patients in the hospital.
3. Maintain safe environment for patients during hospitalization.
4. Explain nursing actions appropriately to the patients and family members.
5. Ensure patient safety while providing nursing procedures.
6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.
7. Provide pre, intra and post-operative care to patients undergoing surgery.
8. Integrate knowledge of pathology, nutrition and pharmacology for patients experiencing various medical and surgical disorders.
9. Integrate evidence-based information while giving nursing care to patients.
10. Demonstrate the awareness of legal and ethical issues in nursing practice.

I. NURSING MANAGEMENT OF PATIENTS WITH MEDICAL CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Intravenous therapy
- Oxygen through mask
- Oxygen through nasal prongs
- Venturi mask
- Nebulization
- Chest physiotherapy

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
General medical	4	Develop skill in intravenous injection administration and IV therapy Assist with diagnostic procedures Develop skill in the management of patients with Respiratory problems Develop skill in managing patients with metabolic abnormality	• Intravenous therapy o IV cannulation o IV maintenance and monitoring o Administration of IV medication • Care of patient with Central line • Preparation and assisting and monitoring of patients undergoing diagnostic procedures such as thoracentesis, Abdominal paracentesis *Management patients with respiratory problems* • Administration of oxygen through mask, nasal prongs, venturi mask • Pulse oximetry • Nebulization • Chest physiotherapy • Postural drainage • Oropharyngeal suctioning • Care of patient with chest drainage • Diet Planning o High Protein diet o Diabetic diet • Insulin administration o Monitoring GRBS	• Care Study – 1 • Health education • Clinical presentation/ Care • note) – 1	• Clinical evaluation • OSCE • Care Study evaluation • Care Note/ Clinical presentation

II. NURSING MANAGEMENT OF PATIENTS WITH SURGICAL CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Nasogastric aspiration
- Surgical dressing
- Suture removal
- Colostomy care/ileostomy care
- Enteral feeding

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
General surgical wards	4	Develop skill in caring for patients during pre- and post-operative period Assist with diagnostic procedures Develop skill in managing patient with Gastro-intestinal Problems Develop skill in wound management	• Pre-Operative care • Immediate Post-operative care • Post-operative exercise • Pain assessment • Pain Management • Assisting diagnostic procedure and after care of patients undergoing ○ Colonoscopy ○ ERCP ○ Endoscopy ○ Liver Biopsy	• Care study – 1 • Health teaching • Nasogastric aspiration • Gastrostomy/Jejunostomy feeds • Ileostomy/Colostomy care • Surgical dressing • Suture removal • Surgical soak • Sitz bath • Care of drain	• Clinical evaluation, OSCE • Care study • Care note/ Clinical presentation

III. NURSING MANAGEMENT OF PATIENTS WITH CARDIAC CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Cardiovascular assessment
- Interpreting ECG
- BLS/BCLS
- CPR
- ABG analysis
- Taking blood sample
- Arterial blood gas analysis – interpretation

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Cardiology wards	2	Develop skill in management of patients with cardiac problems Develop skill in management of patients with disorders of Blood	• Cardiac monitoring • Recording and interpreting ECG • Arterial blood gas analysis – interpretation • Administer cardiac drugs • Preparation and after care of patients for cardiac catheterization • CPR • Collection of blood sample for: o Blood grouping/cross matching o Blood sugar o Serum electrolytes • Assisting with blood transfusion • Assisting for bone marrow aspiration • Application of anti-embolism stockings (TED hose) • Application/maintenance of sequential Compression device	• Cardiac assessment – 1 • Drug presentation – 1	• Clinical evaluation • Drug presentation

IV. NURSING MANAGEMENT OF PATIENTS WITH DISORDERS OF INTEGUMENTARY SYSTEM

A. Skill Lab

Use of manikins and simulators

Application of topical

medication

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Dermatology wards	1	Develop skill in management of patients with disorders of integumentary system	• Intradermal injection-Skin allergy testing • Application of topical medication • Medicated bath		Clinical evaluation

V. NURSING MANAGEMENT OF PATIENTS WITH COMMUNICABLE DISEASES

A. Skill Lab

- Barrier Nursing
- Reverse Barrier Nursing
- Standard precautions

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Isolation ward	1	Develop skill in the management of patients requiring isolation	• Barrier Nursing • Reverse barrier nursing • Standard precautions (Universal precaution), use of PPE, needle stick and sharp injury prevention, Cleaning and disinfection, Respiratory hygiene, waste disposal and safe injection practices)	Care Note – 1	Clinical evaluation Care note

VI. NURSING MANAGEMENT OF PATIENTS WITH MUSCULOSKELETAL PROBLEMS

A. Skill Lab

Use of manikins and simulators

- Range of motion exercises
- Muscle strengthening exercises
- Crutch walking

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Orthopedic wards	2	Develop skill in management of patients with musculoskeletal problems	• Preparation of patient with Myelogram/CT/MRI • Assisting with application & removal of POP/Cast • Preparation, assisting and after care of patient with Skin • traction/skeletal traction • Care of orthotics • Muscle strengthening exercises • Crutch walking • Rehabilitation	Care Note – 1	Clinical evaluation, Care note

VII. NURSING MANAGEMENT OF PATIENTS IN THE OPERATING ROOMS

A. Skill Lab

Use of manikins and simulators

- Scrubbing, gowning and gloving
- Orient to instruments for common surgeries
- Orient to suture materials
- Positioning

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Operation theatre	4	Develop skill in caring for intraoperative patients	• Position and draping • Preparation of operation table • Set up of trolley with instrument • Assisting in major and minor operation • Disinfection and sterilization of equipment • Scrubbing procedures – Gowning, masking and gloving • Intra operative monitoring	Assist as circulatory nurse – 4 Positioning & draping – 5 Assist as scrub nurse in major surgeries – 4 Assist as scrub nurse in minor surgeries – 4	Clinical evaluation OSCE

SYLLABUS

IV SEMESTER

B.Sc. NURSING

PHARMACOLOGY – II

including Fundamentals of Prescribing Module

PLACEMENT: IV SEMESTER

THEORY: 3 Credits (60 hours)

COURSE CODE: PHAR (II) 205

COURSE DESCRIPTION: This course is designed to enable students to acquire understanding of Pharmacodynamics,
Pharmacokinetics, principles of therapeutics & nursing implications. Further it develops understanding of fundamental
principles of prescribing in students.

COMPETENCIES: On completion of the course, the students will be able to

1. Explain the drugs used in the treatment of ear, nose, throat and eye disorders.
2. Explain the drugs used in the treatment of urinary system disorders.
3. Describe the drugs used in the treatment of nervous system disorders.
4. Explain the drugs used for hormonal replacement and for the pregnant women during antenatal, intra natal and postnatal
period.
5. Explain the drugs used to treat emergency conditions and immune disorders.
6. Discuss the role and responsibilities of nurses towards safe administration of drugs used to treat disorders of various
systems with basic understanding of pharmacology.
7. Demonstrate understanding about the drugs used in alternative system of medicine.
8. Demonstrate understanding about the fundamental principles of prescribing.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	4 (T)	Describe drugs used in disorders of ear, nose, throat and eye and nurses' responsibilities	**Drugs used in disorders of ear, nose, throat & Eye** • Antihistamines • Topical applications for eye (Chloramphenicol, Gentamycin eye drops), ear (Soda glycerin, boric spirit ear drops), nose and buccal cavity- chlorhexidine mouthwash • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
II	4 (T)	Describe drugs acting on urinary system & nurse's responsibilities	**Drugs used on urinary system** • Pharmacology of commonly used drugs • Renin angiotensin system o Diuretics and antidiuretics oDrugs toxic to kidney • Urinary antiseptics • Treatment of UTI – acidifiers and alkalinizers • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
III	10 (T)	Describe drugs used on nervous system & nurse's responsibilities	**Drugs acting on nervous system** • Basis & applied pharmacology of commonly used drugs • Analgesics and anaesthetics • Analgesics: Non-steroidal anti-inflammatory (NSAID) drugs • Antipyretics • Opioids & other central analgesics • General (techniques of GA, pre anesthetic medication) & local anesthetics • Gases: oxygen, nitrous, oxide, carbon-dioxide & others • Hypnotics and sedatives • Skeletal muscle relaxants • Antipsychotics • oMood stabilizers	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Antidepressants • Antianxiety Drugs • Anticonvulsants • Drugs for neurodegenerative disorders & miscellaneous drugs • Stimulants, ethyl alcohol and treatment of methyl alcohol poisoning • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse		
IV	5 (T)	Describe drugs used for hormonal disorder & supplementation, contraception & medical termination of pregnancy & nurse‘s responsibilities	• Drugs used for hormonal, disorders and supplementation, contraception and medical termination of pregnancy • Estrogens and progesterones • Oral contraceptives and hormone replacement therapy • Vaginal contraceptives • Drugs for infertility and medical termination of pregnancy • Uterine stimulants and relaxants • Composition, actions dosage route indications contraindications, drugs interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
V	3 (T)	Develop understanding about important drugs used for women before, during and after labour	• Drugs used for pregnant women during antenatal, labour and postnatal period • Tetanus prophylaxis • Iron and Vit K1 supplementation • Oxytocin, Misoprostol • Ergometrine • Methyl prostaglandin F2-alpha • Magnesium sulphate • Calcium gluconate	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VI	10 (T)	Describe drugs used in deaddiction, emergency, poisoning, vitamins & minerals supplementation, drugs used for immunization & immune-suppression & nurse‘s responsibilities	• Miscellaneous • Drugs used for deaddiction • Drugs used in CPR and emergency- adrenaline, Chlorpheniramine, hydrocortisone, Dexamethasone • IV fluids & electrolytes replacement • Common poisons, drugs used for treatment of poisoning • oActivated charcoal	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Ipecac • Antidotes, • Anti-snake venom (ASV) • Vitamins and minerals supplementation • Vaccines & sera (Universal immunization program schedules) • Anticancer drugs: Chemotherapeutic drugs commonly used • Immuno-suppressants and Immunostimulants		
VII	4 (T)	Demonstrate awareness of common drugs used in alternative system of medicine	• Introduction to drugs used in alternative systems of medicine • Ayurveda, Homeopathy, Unani and Siddha etc. • Drugs used for common ailments	• Lecture cum Discussion • Observational visit	• Short answer • Objective type
VIII	20 (T)	Demonstrate understanding about fundamental principles of prescribing	• Fundamental principles of prescribing • Prescriptive role of nurse practitioners: Introduction • Legal and ethical issues related to prescribing • Principles of prescribing • Steps of prescribing • Prescribing competencies	• Completion of module on Fundamental principles of prescribing	• Short answer • Assignments evaluation

PATHOLOGY - II AND GENETICS

PLACEMENT: IV SEMESTER

THEORY: 1 Credit (20 hours) (Includes lab hours also)

COURSE CODE: PATH(II) 210

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology
2. Rationalize the various laboratory investigations in diagnosing pathological disorders
3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests
4. Apply the knowledge of genetics in understanding the various pathological disorders
5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities
6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.
7. Demonstrate the understanding of various services related to genetics

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Explain pathological changes in disease conditions of various systems	**Special Pathology:** **Pathological changes in disease conditions of selected systems** **1. Kidneys and Urinary tract** • Glomerulonephritis • Pyelonephritis • Renal calculi • Cystitis • Renal Cell Carcinoma • Renal Failure (Acute and Chronic) **2. Male genital systems** • Cryptorchidism • Testicular atrophy • Prostatic hyperplasia • Carcinoma penis and Prostate. **3. Female genital system** • Carcinoma cervix • Carcinoma of endometrium • Uterine fibroids • Vesicular mole and Choriocarcinoma • Ovarian cyst and tumors **4. Breast** • Fibrocystic changes • Fibroadenoma • Carcinoma of the Breast **5. Central nervous system** • Meningitis. • Encephalitis • Stroke • Tumors of CNS	• Lecture • Discussion • Explain using slides, X-rays and scans • Visit to pathology lab, endoscopy unit and OT	• Short answer • Objective type

II	5 (T)	Describe the laboratory tests for examination of body cavity fluids, urine and faeces	**Clinical Pathology** • Examination of body cavity fluids: o Methods of collection and examination of CSF and other body cavity fluids (sputum, wound discharge) specimen for various clinical pathology, biochemistry and microbiology tests • Analysis of semen: o Sperm count, motility and morphology and their importance in infertility • Urine: o Physical characteristics, Analysis, Culture and Sensitivity • Faeces: o Characteristics o Stool examination: Occult blood, Ova, Parasite and Cyst, Reducing substance etc. Methods and collection of urine and faeces for various tests	• Lecture • Discussion • Visit to clinical lab and biochemistry lab	• Short answer • Objective type

GENETICS

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Explain nature, principles and perspectives of heredity	**Introduction:** • Practical application of genetics in nursing • Impact of genetic condition on families • Review of cellular division: mitosis and meiosis • Characteristics and structure of genes • Chromosomes: sex determination • Chromosomal aberrations • Patterns of inheritance • Mendelian theory of inheritance • Multiple allots and blood groups • Sex linked inheritance • Mechanism of inheritance • Errors in transmission (mutation)	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
II	2 (T)	Explain maternal, prenatal and genetic influences on development of defects and diseases	**Maternal, prenatal and genetic influences on development of defects and diseases** • Conditions affecting the mother: genetic and infections • Consanguinity atopy • Prenatal nutrition and food allergies • Maternal age • Maternal drug therapy • Prenatal testing and diagnosis • Effect of Radiation, drugs and chemicals • Infertility • Spontaneous abortion • Neural Tube Defects and the role of folic acid in lowering the risks • Down syndrome (Trisomy 21)	• Lecture • Discussion • Explain using slides	• Short answer • Objective type

III	2 (T)	Explain the screening methods for genetic defects and diseases in neonates and children	**Genetic testing in the neonates and children** • Screening for ○ Congenital abnormalities ○ Developmental delay ○ Dysmorphism	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
IV	2 (T)	Identify genetic disorders in adolescents and adults	**Genetic conditions of adolescents and adults** • Cancer genetics: Familial cancer • Inborn errors of metabolism • Blood group alleles and hematological disorder • Genetic haemochromatosis • Huntington‘s disease • Mental illness	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
V	2 (T)	Describe the role of nurse in genetic services and counselling	**Services related to genetics** • Genetic testing • Gene therapy • Genetic counseling • Legal and Ethical issues • Role of nurse	• Lecture • Discussion	• Short answer • Objective type

ADULT HEALTH NURSING - II WITH INTEGRATED PATHOPHYSIOLOGY INCLUDING GERIATRIC NURSING AND PALLIATIVE CARE MODULE

PLACEMENT: IV SEMESTER

THEORY: 7 Credits (140 hours)

COURSE CODE: N-AHN(II)225

PRACTICUM: Lab/Skill Lab (SL): 1 Credit (40 hours) Clinical: 6 Credits (480 hours)

COURSE DESCRIPTION: This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative and rehabilitative care to adult patients with various Medical Surgical disorders.

COMPETENCIES: On completion of the course the students will apply nursing process and critical thinking in delivering holistic nursing care with selected Medical and Surgical conditions.

At the completion of Adult Health Nursing II course, students will

1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of selected common medical and surgical disorders.
2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of diagnostic tests in the process of data collection.
3. Identify diagnoses, list them according to priority and formulate nursing care plan.
4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.
5. Integrate knowledge of anatomy, physiology, pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.
6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.
7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.
8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.
9. Identify the drugs used in treating patients with selected medical surgical conditions.
10. Plan and provide relevant individual and group education on significant medical surgical topics.
11. Maintain safe environment for patients and the health care personnel in the hospital.

COURSE OUTLINE

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	12 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and medical, surgical, nutritional and nursing management of patients with ENT disorders	**Nursing management of patient with disorders of Ear, Nose and Throat** (Includes etiology, pathophysiology, clinical manifestations, diagnostic measures and medical, surgical, nutritional and nursing management) • Review of anatomy and physiology of the ear, nose and throat • History, physical assessment, and diagnostic tests • **Ear** o External ear: deformities otalgia, foreign bodies and tumors o Middle ear: impacted wax, tympanic, membrane perforation, otitis media, and tumors o Inner ear: Meniere's disease, labyrinthitis, ototoxicity tumors • Upper respiratory airway infections: Rhinitis, sinusitis, tonsillitis, laryngitis • Epistaxis, Nasal obstruction, laryngeal obstruction • Deafness and its management	• Lecture and discussion • Demonstration of hearing aids, nasal packing, medication administration • Visit to audiology and speech clinic	• MCQ • Short answer • Essay • OSCE • Assessment of skill (using checklist) • Quiz • Drug book

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
II	12 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with disorders of eye Describe eye donation, banking and transplantation	**Nursing management of patient with disorder of eye** • Review of anatomy and physiology of the eye • History, physical assessment, diagnostic assessment **Eye Disorders** • Refractive errors • Eyelids: infection, deformities • Conjunctiva: inflammation and infection bleeding • Cornea: inflammation and infection • Lens: cataract • Glaucoma • Retinal detachment • Blindness • Eye donation, banking and transplantation	• Lecture and discussion • Demonstration of visual aids, lens, medication administration • Visit to eye bank	• MCQ • Short Essay • OSCE • Drug book
III	15 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of Kidney and urinary system disorders Demonstrate skill in genitourinary assessment Prepare patient for genitourinary investigations	**Nursing management of patient with Kidney and Urinary problems** • Review of Anatomy and physiology of the genitourinary system • History, physical assessment, diagnostic tests • Urinary tract infections: acute, chronic, lower, upper • Nephritis, nephrotic syndrome • Renal calculi • Acute and chronic renal failure • Disorders of ureter, urinary bladder and Urethra • Disorders of prostate: inflammation, infection, stricture, obstruction, and Benign Prostate Hypertrophy	• Lecture cum Discussion • Demonstration • Case Discussion • Health education • Drug book • Field visit – Visits hemodialysis unit	• MCQ • Short Note • Long essay • Case report • Submits health teaching on prevention of urinary calculi

IV	6 (T)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of male reproductive disorders	**Nursing management of disorders of male reproductive system** • Review of Anatomy and physiology of the male reproductive system • History, Physical Assessment, Diagnostic tests Infections of testis, penis and adjacent structures: Phimosis, Epididymitis, and Orchitis • Sexual dysfunction, infertility, contraception • Male Breast Disorders: gynecomastia, tumor, climacteric changes	• Lecture, Discussion • Case Discussion • Health education	• Short essay
V	10 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, types, diagnostic measures and management of patients with disorders of burns/cosmetic surgeries and its significance	**Nursing management of patient with burns, reconstructive and cosmetic surgery** • Review of anatomy and physiology of the skin and connective tissues • History, physical assessment, assessment of burns and fluid & electrolyte loss • Burns • Reconstructive and cosmetic surgery for burns, congenital deformities, injuries and cosmetic purposes, gender reassignment • Legal and ethical aspects • Special therapies: LAD, vacuumed dressing. Laser, liposuction, skin health rejuvenation, use of derma filters	• Lecture and discussion • Demonstration of burn wound assessment, vacuum dressing and fluid calculations • Visit to burn rehabilitation centers	• OSCE • Short notes

VI	16 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with neurological disorders	**Nursing management of patient with neurological disorders** • Review of anatomy and physiology of the neurological system • History, physical and neurological assessment, diagnostic tests • Headache, Head injuries • Spinal injuries: Paraplegia, Hemiplegia, Quadriplegia • Spinal cord compression: herniation of in vertebral disc • Intra cranial and cerebral aneurysms • Meningitis, encephalitis, brain, abscess, neuro-cysticercosis • Movement disorders: Chorea, Seizures & Epilepsies • Cerebrovascular disorders: CVA • Cranial, spinal neuropathies: Bell's palsy, trigeminal neuralgia • Peripheral Neuropathies • Degenerative diseases: Alzheimer's disease, Parkinson's disease • *Guillain-Barré syndrome*, Myasthenia gravis & Multiple sclerosis • Rehabilitation of patient with neurological deficit	• Lecture and discussion • Demonstration of physiotherapy, neuro assessment, tracheostomy care • Visit to rehabilitation center, long term care clinics, EEG, NCV study unit,	• OSCE • Short notes • Essay • Drug book

VII	12 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of immunological disorders Prepare and provides health education on prevention of HIV infection and rehabilitation Describe the national infection control programs	**Nursing management of patients with Immunological problems** • Review of Immune system • Nursing Assessment: History and Physical assessment • HIV & AIDS: Epidemiology, Transmission, Prevention of Transmission and management of HIV/AIDS • Role of Nurse; Counseling, Health education and home care consideration and rehabilitation • National AIDS Control Program – NACO, various national and international agencies for infection control	• Lecture, discussion • Case Discussion/ seminar • Refer Module on HIV/AIDS	
VIII	12 (T) 4 (L/SL)	Explain the etiology, pathophysiology, types, clinical manifestations, staging, diagnostic measures and management of patients with different cancer, treatment modalities including newer treatments	**Nursing management of patient with Oncological conditions** • Structure and characteristics of normal and cancer cells • History, physically assessment, diagnostic tests • Prevention screening early detections warning sign of cancer • Epidemiology, etiology classification, Pathophysiology, staging clinical manifestations, diagnosis, treatment modalities and medical and surgical nursing management of Oncological condition • Common malignancies of various body system eye, ear, nose, larynx, breast, cervix, ovary, uterus, sarcoma, renal, bladder, kidney, prostate Brain, Spinal cord. • Oncological emergencies • Modalities of treatment: Chemotherapy, Radiotherapy: Radiation safety, AERB regulations, Surgical intervention, Stem cell and	• Lecture and discussion • Demonstration of chemotherapy preparation and administration • Visit to BMT, radiotherapy units (linear accelerator, brachytherapy, etc.), nuclear medicine unit • Completion of palliative care module module during clinical hours (20 hours)	• OSCE • Essay • Quiz • Drug book • Counseling, health teaching

IX	15 (T) 4 (L/SL)	Explain the types, policies, guidelines, prevention and management of disaster and the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with acute emergencies	**Nursing management of patient in Emergency and Disaster situations** **Disaster Nursing** • Concept and principles of disaster nursing, Related Policies • Types of disaster: Natural and manmade • Disaster preparedness: Team, guidelines, protocols, equipment, resources • Etiology, classification, Pathophysiology, staging, clinical manifestation, diagnosis, treatment modalities and medical and surgical nursing management of patient with medical and surgical emergencies – Poly trauma, Bites, Poisoning and Thermal emergencies • Principles of emergency management • Medico legal aspects	• Lecture and discussion • Demonstration of disaster preparedness (Mock drill) and triaging • Filed visit to local disaster management centers or demo by fire extinguishers • Group presentation (role play, skit, concept mapping) on different emergency care • **Refer Trauma care management/ ATCN module** • Guided reading on National Disaster Management Authority (NDMA) guidelines	• OSCE • Case • presentations and case study
X	10 (T)	Explain the Concept, physiological changes, and psychosocial problems of ageing Describe the nursing management of the elderly	**Nursing care of the elderly** • History and physical assessment • Aging process and age-related body changes and psychosocial aspects • Stress and coping in elder patient • Psychosocial and sexual abuse of elderly • Role of family and formal and non- formal caregivers • Use of aids and prosthesis (hearing aids, dentures) • Legal and ethical issues • National programs for elderly, privileges, community programs and health services • Home and institutional care	• Lecture and discussion • Demonstration of communication with visual and hearing impaired • Field visit to old age homes	• OSCE • Case presentations • Assignment on family systems of India focusing on geriatric population

XI	15 (T) 8 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients in critical care units	**Nursing management of patients in critical Care units** • Principles of critical care nursing • Organization: physical set-up, policies, staffing norms • Protocols, equipment and supplies • Use and application of critical care biomedical equipment: ventilators, cardiac monitors, defibrillators, infusion pump, Resuscitation equipment and any other • Advanced Cardiac Life support • Nursing management of critically ill patient • Transitional care • Ethical and Legal Aspects • Breaking Bad News to Patients and/or their families: Communication with patient and family • End of life care	• Lecture and discussion • Demonstration on the use of mechanical ventilators, cardiac monitors etc. • Clinical practice in different ICUs	• Objective type • Short notes • Case presentations • Assessment of skill on monitoring of patients in ICU. • Written assignment on ethical and legal issues in critical care
XII	5 (T)	Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with occupational/ industrial health disorders	**Nursing management of patients occupational and industrial disorders** • History, physical examination, Diagnostic tests • Occupational diseases and management	• Lecture and discussion • Industrial visit	• Assignment on industrial health hazards

CLINICAL PRACTICUM

CLINICAL PRACTICUM: 6 Credits (480 Hours) – **20 weeks × 24 hours**

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will develop proficiency in applying nursing process and critical thinking in rendering holistic nursing care including rehabilitation to the adult/geriatric patients admitted in Critical Care Units, undergoing cosmetic and reconstructive surgery and with selected medical & surgical disorders of ear, nose, throat, eye, Genitourinary, reproductive, immunologic, nervous systems and in emergency/disaster conditions.

The students will be competent to

1. Utilize the nursing process in providing care to the sick adults in the hospital
    a. Perform complete health assessment to establish a data base for providing quality patient care.
    b. Integrate the knowledge of diagnostic tests in patient assignment.
    c. Identify nursing diagnoses and list them according to priority.
    d. Formulate nursing care plan, using problem solving approach.
    e. Apply scientific principles while giving nursing care to patients.
    f. Develop skill in performing nursing procedures applying scientific principle.
    g. Establish/develop interpersonal relationship with patients and family members.
    h. Evaluate the expected outcomes and modify the plan according to the patient needs.
2. Provide comfort and safety to adult patients in the hospital.
3. Maintain safe environment for patients during hospitalization.
4. Explain nursing actions appropriately to the patients and family members.
5. Ensure patient safety while providing nursing procedures.
6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.
7. Provide pre, intra and post-operative care to patients undergoing surgery.
8. Integrate knowledge of pathology, nutrition and pharmacology for patients experiencing selected medical and surgical disorders.
9. Integrate evidence-based information while giving nursing care to patients.
10. Demonstrate the awareness of legal and ethical issues in nursing practice

I. Nursing Management of Patients with ENT Disorders

A. Skill Lab

Use of manikins and simulators

- Tracheostomy care
- Instilling Ear and Nasal medications
- Bandage application

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
ENT Ward and OPD	2	Provide care to patients with ENT disorders Educate the patients and their families	• Examination of ear, nose, throat and History taking • Applying bandages to Ear, Nose • Tracheostomy care • Preparation of patient, assisting and monitoring of patients undergoing diagnostic procedures ○ Auditory screening tests ○ **Audiometric tests** • Preparing the patient and assisting in special procedures like Anterior/ posterior nasal packing, Ear Packing and Syringing • Preparation and after care of patients undergoing ENT surgical procedures • Instillation of drops/medication	• ENT assessment –1 • Case study/ Clinical presentation – 1	• Clinical evaluation • OSCE • Case report study/ Clinical presentation

II. Nursing Management of Patients with Eye Conditions

A. Skill Lab

Use of manikins and simulators

- Instilling Eye medications
- Eye irrigation
- Eye bandage

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Ophthalmology unit	2	Develop skill in providing care to patients with Eye disorders	History taking, Examination of eyes and interpretation Assisting procedures Visual acuity Fundoscopy, retinoscopy, ophthalmoscopy, tonometry, Refraction tests ○ Refraction tests	• Eye assessment – 1 • Health teaching • Case study/ Clinical Presentation – 1	• Clinical evaluation • OSCE • Clinical presentation

		Educate the patient and their families	• Pre and post-operative care • Instillation of drops/ medication • Eye irrigation • Application of eye bandage • Assisting with foreign body		

III. Nursing Management of Patients with Kidney and Urinary System Disorders

A. Skill Lab

Use of manikins and simulators

- Assessment: kidney & urinary system
- Preparation: dialysis
- Catheterization and care

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Renal ward/ nephrology ward including Dialysis unit	2	Develop skill in Management of patients with urinary, male reproductive problems	• Assessment of kidney and urinary system ○ History taking ○ Physical examination ○ Testicular self-examination odigital rectal exam • Preparation and assisting with diagnostic and therapeutic procedures ○ Cystoscopy, Cystometrogram, ○ Contrast studies: IVP etc. ○ Peritoneal dialysis ○ Hemodialysis, ○ Lithotripsy ○ Specific tests: Semen analysis, gonorreoea test, Renal/ Prostate Biopsy etc. • Catheterization: care • Bladder irrigation • I/O recording and monitoring • Ambulation and exercise	• Assessment – 1 • Drug presentation – 1 • Care study/ Clinical presentation – 1 • Preparing and assisting in hemodialysis	• Clinical evaluation • Care plan • OSCE • Quiz • Drug presentation

IV. Nursing Management of Patients with Burns and Reconstructive Surgery

A. Skill Lab

Use of manikins and simulators

- Assessment of burns wound
- Wound dressing

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Burns unit/ reconstructive surgical unit	2	Develop skill in burns assessment and providing care to patients with different types of burns Develop skill in providing care to patients with different types of cosmetic and reconstructive surgeries	• Assessment of burns • First aid of burns • Fluid & electrolyte replacement therapy • Skin care • Care of Burn wounds – Bathing – Dressing • Pre-operative and post- operative care of patients • Caring of skin graft and post cosmetic surgery • Rehabilitation	• burn wound assessment – 1 • care study/case presentation – 1	• Clinical evaluation, • Care study/case report

V. Nursing Management of Patients with neurological disorders

A. Skill Lab

Use of manikins and simulators

- Range of motion exercises
- Muscle strengthening exercises
- Crutch walking

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Neurology medical/ Surgery wards	3	Develop skill in Management of patients with Neurological problems	• History taking; Neurological Examination • Patient monitoring • Prepare and assist for various invasive and non-invasive diagnostic procedures	Neuro-assessment –1 Case study/ case presentation – 1	• Clinical evaluation • Neuro assessment • OSCE

			• Range of motion exercises, muscle strengthening • Care of medical, surgical and rehabilitative patients	Drug presentation – 1	• presentations

VI. Nursing Management of Patients with Immunological Disorders

A. Skill Lab

- Barrier Nursing
- Reverse Barrier Nursing

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Isolation ward/ Medical ward	1	Develop skill in the Management of patients with immunological disorders	• History taking • Immunological status assessment (e.g. HIV) and Interpretation of specific tests • Caring of patients with low immunity • Practicing of standard safety measures, precautions/barrier nursing/reverse barrier/isolation skills	• Assessment of immune status • Teaching of isolation to patient and family care givers • Nutritional management • Care Note – 1	• Care note • Quiz • Health Teaching

VII. Nursing Management of Patients with disorders of Oncological conditions

A. Skill Lab

Use of manikins and simulators

- Application of topical medication
- Administration of chemotherapy

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Oncology wards (including day care radiotherapy unit)	3	Develop skill in providing care to patients with oncological disorders	• History taking & physical examination of cancer patients • Screening for common cancers: TNM classification • Preparation, assisting and after care patients undergoing diagnostic procedures – Biopsies/FNAC – Pap smear – Bone-marrow aspiration • Various modalities of treatment – Chemotherapy – Radiotherapy – Pain management – Stoma therapy – Hormonal therapy – Immuno-therapy – Gene therapy – Alternative therapy • Stoma care and feeding • Caring of patients treated with nuclear medicine • Rehabilitation	• Assessment – 1 • Care study/ clinical presentation – 1 • Pre and post-operative care of patient with various modes of cancer treatment • Teaching on BSE to family members • Visit to palliative care unit	• Clinical evaluation • Care study • Quiz • Drug book

VIII. Nursing Management of Patients in emergency conditions

A. Skill Lab

Use of manikins and simulators

- Assessment: primary and secondary survey
- Trauma care: bandaging, wound care, splinting, positions

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Emergency room/ Emergency unit	2	Develop skill in providing care to patients with emergency health problems	• Practicing ‗triage' • Primary and secondary survey in emergency • Examination, investigations & their interpretations, in emergency & disaster situations • Emergency care of medical and traumatic injury patients • Documentations, assisting in legal procedures in emergency unit • Managing crowd • Counseling the patient and family in dealing with grieving & bereavement	• Triage • Immediate care • Use of emergency trolley	• Clinical evaluation • Quiz

IX. Nursing Management of geriatric patients

A. Skill Lab

Use of manikins and simulators

- **Use of assistive safety devices**

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Geriatric ward	1	Develops skill in geriatric assessment and providing care to patients with geriatric illness	• History taking and assessment of Geriatric patient	• Geriatric assessment – 1 • Care of normal and geriatric patient with illness • Fall risk assessment – 1 • Functional status assessment – 1	• Clinical evaluation • Care plan

X. Nursing Management of Patients in critical care units

A. Skill Lab

Use of manikins and simulators

- Assessment critically ill
- ET tube set up –suction
- TT suction
- Ventilator set up
- Chest drainage
- Bag mask ventilation
- Central & Peripheral line
- Pacemaker

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Critical Care Unit	2	Develop skill in assessment of critically ill and providing care to patients with critical health conditions	• Assessment of critically ill patients • Assisting in arterial puncture, ET tube intubation & extubation • ABG analysis & interpretation - respiratory acidosis, respiratory alkalosis, metabolic acidosis, metabolic alkalosis • Setting up of Ventilator modes and settings and care of patient on a ventilator • Set up of trolley with instruments • Monitoring and maintenance of Chest drainage system • Bag and mask ventilation • Assisting and maintenance of Central and peripheral lines invasive • Setting up of infusion pump, defibrillator, • Drug administration-infusion, intracardiac, intrathecal, epidural, • Monitoring pacemaker • ICU care bundle • Management of the dying patient in the ICU	• Hemodynamic monitoring • Different scales used in ICU • Communicating with critically ill patients	• Clinical evaluation • OSCE • RASS scale assessment • Use of VAE bundle VAP, CAUTI, BSI • Case Presentation

PROFESSIONALISM, PROFESSIONAL VALUES & ETHICS INCLUDING BIOETHICS

PLACEMENT: IV SEMESTER

THEORY: 1 Credit (20 hours)

COURSE CODE: PROF 230

COURSE DESCRIPTION: This course is designed to help students to develop an understanding of professionalism and demonstrate professional behavior in their workplace with ethics and professional values. Further the students will be able to identify ethical issues in nursing practice and participate effectively in ethical decision making along with health team members.

COMPETENCIES: On completion of this course, the students will be able to

1. Describe profession and professionalism.
2. Identify the challenges of professionalism.
3. Maintain respectful communication and relationship with other health team members, patients and society.
4. Demonstrate professional conduct.
5. Describe various regulatory bodies and professional organizations related to nursing.
6. Discuss the importance of professional values in patient care.
7. Explain the professional values and demonstrate appropriate professional values in nursing practice.
8. Demonstrate and reflect on the role and responsibilities in providing compassionate care in the healthcare setting.
9. Demonstrate respect, human dignity and privacy and confidentiality to self, patients and their caregivers and other health team members.
10. Advocate for patients'wellbeing, professional growth and advancing the profession.
11. Identify ethical and bioethical concerns, issues and dilemmas in nursing and healthcare.
12. Apply knowledge of ethics and bioethics in ethical decision making along with health team members.
13. Protect and respect patient's rights.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Discuss nursing as a profession Describe the concepts and attributes of professionalism Identify the challenges of professionalism Maintain respectful communication and relationship with other health team members, patients and society Demonstrate professional conduct Respect and maintain professional boundaries between patients, colleagues and society Describe the roles and responsibilities of regulatory bodies and professional organizations	**PROFESSIONALISM** • Profession • Definition of profession • Criteria of a profession • Nursing as a profession **Professionalism** • Definition and characteristics of professionalism • Concepts, attributes and indicators of professionalism ***Challenges of professionalism*** • Personal identity vs professional identity • Preservation of self-integrity: threat to integrity, Deceiving patient: withholding information and falsifying records • Communication & Relationship with team members: Respectful and open communication and relationship pertaining to relevant interests for ethical decision making • Relationship with patients and society **Professional Conduct** • Following ethical principles • Adhering to policies, rules and regulation of the institutions • Professional etiquettes and behaviours • Professional grooming: Uniform, Dress code • Professional boundaries: Professional relationship with the patients, caregivers and team members **Regulatory Bodies & Professional Organizations: Roles & Responsibilities** • *Regulatory bodies*: Indian Nursing Council, State Nursing Council • *Professional Organizations:* Trained Nurses Association of India (TNAI), Student Nurses Association (SNA), Nurses League of Christian Medical Association of India, International Council of Nurses (ICN) and International Confederation of Midwives	• Lecture cum Discussion • Debate • Role play • Case based discussion • Lecture cum Discussion • Visit to INC, SNC, TNAI	• Short answer • Essay • Objective type

II	5 (T)	Discuss the importance of professional values Distinguish between personal values and professional values Demonstrate appropriate professional values in nursing practice	• Regulatory Bodies & Professional • Organizations: Roles & Responsibilities • Regulatory bodies: Indian Nursing • Council, State Nursing Council • Professional Organizations: Trained • Nurses Association of India (TNAI), • Student Nurses Association (SNA), • Nurses League of Christian Medical • Association of India, International • Council of Nurses (ICN) and • International **PROFESSIONAL VALUES** • Values: Definition and characteristics of values • Value clarification • Personal and professional values • Professional socialization: Integration of professional values with personal values **Professional values in nursing** • Importance of professional values in nursing and health care • Caring: definition, and process • Compassion: Sympathy Vs empathy, Altruism • Conscientiousness • Dedication/devotion to work • Respect for the person- Human dignity • Privacy and confidentiality: Incidental disclosure • Honesty and integrity: Truth telling • Trust and credibility: Fidelity, Loyalty • Advocacy: Advocacy for patients, work environment, nursing education and practice, and for advancing the profession	• Lecture cum Discussion • Value clarification exercise • Interactive learning • Story telling • Sharing experiences • Scenario based discussion	• Short answer • Essay • Assessment of student‘s behavior with patients and families

III	10 (T)	Define ethics & bioethics
		
		Explain ethical principles
		
		Identify ethical concerns
		
		Ethical issues and dilemmas in health care
			ETHICS & BIOETHICS
			Definitions: Ethics, Bioethics and Ethical Principles
			• Beneficence
			• Non-maleficence: Patient safety, protecting patient from harm, Reporting errors
			• Justice: Treating each person as equal
			• Care without discrimination, equitable access to care and safety of the public
			• Autonomy: Respects patients' autonomy, Self-determination, Freedom of choice
			Ethical issues and ethical dilemma: **Common ethical problems**
			• Conflict of interest
			• Paternalism
			• Deception
			• Privacy and confidentiality
			• Valid consent and refusal
			• Allocation of scarce nursing resources
			• Conflicts concerning new technologies
			• Whistle-blowing
			• *Beginning of life issues*
			  • Abortion
			  • Substance abuse
			  • Fetal therapy
			  • Selective deduction
			  • Intrauterine treatment of fetal conditions
			  • Mandated contraception
			  • Fetal injury
			  • Infertility treatment
			• *End of life issues*
			  • End of life
			  • Euthanasia
			  • Do Not Resuscitate (DNR)
				• Lecture cum discussion
				• Group discussion with examples
				• Flipping/ self-directed learning
				• Role play
				• Story telling
				• Sharing experiences
				• Case based Clinical discussion
				• Role modeling
				• Group exercise on ethical decision-making following steps on a given scenario
				• Assignment
					• Short answer
					• Essay
					• Quiz
					• Reflective diary
					• Case report
					• Attitude test
					• Assessment of assignment

		ethical decision making and apply knowledge of ethics and bioethics in making ethical decisions stipulated by ICN INC	• *Issues related to psychiatric care* ○ Non-compliance ○ Restrain and seclusion ○ Refuse to take food **Process of ethical decision making** • Assess the situation (collect information) • Identify the ethical problem • Identify the alternative decisions • Choose the solution to the ethical decision • Implement the decision • Evaluate the decision **Ethics committee: Roles and responsibilities** • Clinical decision making • Research **Code of Ethics** • International Council of Nurses (ICN) • Indian Nursing Council		

		Discuss the rights of the patients and families to make decisions about care Protect and respect patients' rights	**Patients' Bill of Rights-17 patients' rights (MoH&FW, GoI)** 1. Right to emergency medical care 2. Right to safety and quality care according to standards 3. Right to preserve dignity 4. Right to nondiscrimination 5. Right to privacy and confidentiality 6. Right to information 7. Right to records and reports 8. Right to informed consent 9. Right to second opinion 10. Right to patient education 11. Right to choose alternative treatment options if available 12. Right to choose source for obtaining medicines or tests 13. Right to proper referral and transfer, which is free from perverse commercial influences 14. Right to take discharge of patient or receive body of deceased from hospital 15. Right to information on the rates to be charged by the hospital for each type of service provided and facilities available on a prominent display board and a brochure 16. Right to protection for patients involved in clinical trials, biomedical and health research 17. Right to be heard and seek redressal		

SYLLABUS

V SEMESTER

B.Sc. NURSING

CHILD HEALTH NURSING - I

PLACEMENT: V SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Lab/Skill Lab: 1 Credit (40 hours) Clinical: 2 Credits (160 hours)

COURSE CODE: N-CHN(I)301

COURSE DESCRIPTION: This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding of the history and modern concepts of child health and child-care.
2. Explore the national child welfare services, national programs and legislation in the light of National Health Policy 2017.
3. Describe the role of preventive pediatrics and perform preventive measures towards accidents.
4. Participate in national immunization programs/Universal Immunization Program (UIP).
5. Identify the developmental needs of children and provide parental guidance.
6. Describe the principles of child health nursing and perform child health nursing procedures.
7. Demonstrate competencies in newborn assessment, planning and implementation of care to normal and high-risk newborn including neonatal resuscitation.
8. Apply the principles and strategies of Integrated management of neonatal and childhood illness (IMNCI).
9. Apply the knowledge of pathophysiology and provide nursing care to children with respiratory system disorders.
10. Identify and meet childhood emergencies and perform child CPR.

COURSE OUTLINE

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	10 (T) 10 (L)	Explain the modern concept of child-care Describe National policy, programs and legislation in relation to child health & welfare Describe role of preventive pediatrics	**Introduction**: **Modern concepts of child- care** ○ Historical development of child health ○ Philosophy and modern concept of child-care ○ Cultural and religious considerations in child-care ○ National policy and legislations in relation to child health and welfare ○ National programs and agencies related to welfare services to the children ○ Internationally accepted rights of the child ○ Changing trends in hospital care, preventive, promotive and curative aspect of child health ○ *Preventive pediatrics:* •Concept •Immunization Immunization programs and cold chain. ○ Care of under-five and Under-five Clinics/Well-baby clinics ○ Preventive measures towards accidents ○ Child morbidity and mortality rates ○ Difference between an adult and child which affect response to illness •Physiolgica •Psycholoical Social •Immunological ○ bereavement ○ The role of a child health nurse in caring for a hospitalized child	• Lecture Discussion • Demonstration of common pediatric procedures	• Short answer • Objective type • Assessment of skills with checklist

		List major causes of death during infancy, early & late childhood Differentiate between an adult and child in terms of illness and response Describe the major functions & role of the pediatric nurse in caring for a hospitalized child. Describe the principles of child health nursing and perform child health nursing procedures	• Principles of pre and postoperative care of infants and children. *Child Health Nursing procedures:* • Administration of medication: oral, I/M, & I/V • Calculation of fluid requirement • Application of restraints • Assessment of pain in children. o FACES pain rating scale o FLACC scale ○ Numerical scale		
II	12 (T)	Describe the normal growth and development of children at different ages Identify the needs of children at different ages & provide parental guidance Identify the nutritional needs of children at different ages & ways of meeting needs Identify the role of play for normal & sick children	**The Healthy Child** Definition and principles of growth and development Factors affecting growth and development Growth and development from birth to adolescence Growth and developmental theories (Freud, Erickson, Jean Piaget, Kohlberg) The needs of normal children through the stages of developmental and parental guidance Nutritional needs of children and infants • breast feeding • exclusive breast feeding • Supplementary/artificial feeding and weaning Baby friendly hospital concept Types and value of play and selection of play material	• Lecture Discussion • Demonstration • Developmental study of infant and children • Observation study of normal & sick child • Field visit to Anganwadi, child guidance clinic • Videos on breast feeding • Clinical practice/field • Refer/consult MAA mothers Absolute Affection program for Breast feeding module (National guideline)	• Short answer • Objective type • Assessment of field visits and developmental study reports

III	15 (T) 20 (L)	Provide care to normal and high-risk neonates Perform neonatal resuscitation Recognize and manage common neonatal problems	**Nursing care of neonate:** • Appraisal of Newborn • Nursing care of a normal newborn/essential newborn care • Neonatal resuscitation • Nursing management of low birth weight baby • Kangaroo mother care • Nursing management of common neonatal disorder - Hyperbilirubinemia - Hypothermia - Hyperthermia - Metabolic disorder - Neonatal infections - Neonatal seizures - Respiratory distress syndrome - Retinopathy of Prematurity • Organization of neonatal care unit • Neonatal equipment	• Modular based teaching**: ENBC and FBNC module (oral drills, videos, self-evaluation exercises)** • Workshop on neonatal resuscitation: NRP module • Demonstration • Practice Session • Clinical practice • Lecture Discussion	• OSCE • Short answer • Objective type
IV	10 (T) 5 (L)	Apply principles and strategies of IMNCI	**Integrated management of neonatal and childhood Illnesses**	*Modular based teaching:* **IMNCI module** • Clinical practice/field	• OSCE
V	8 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with disorders of respiratory, and endocrine system	**Nursing management in common childhood diseases** **Respiratory system**: • Identification and Nursing management of congenital malformations • Congenital disorders: Tracheoesophageal fistula, Diaphragmatic hernia	• Lecture Discussion • Demonstration • Practice session • Clinical practice	• Short answer • Objective type • Assessment of skills with checklist

			• Others: Acute naso-pharyngitis, Tonsillitis, Croup, Bronchitis, Bronchiolitis, Pneumonia, Asthma **Endocrine system**: • Juvenile Diabetes mellitus, Hypo-thyroidism		
VI	5 (T) 5 (L)	Develop ability to meet child- hood emergencies and perform child CPR	**Childhood emergencies** • Accidents – causes and prevention, Poisoning, Foreign bodies, Hemorrhage, Burns and Drowning • PLS (AHA Guidelines)	• Lecture • Discussion • Demonstration • PLS Module/ Workshop	• OSCE

CHILD HEALTH NURSING - I & II CLINICAL (3 Credits – 240 hours)

PLACEMENT: V & VI SEMESTER

PRACTICUM: Skill Lab: 1 Credit (40 hours)

Clinical: V SEMESTER – 2 Credits (160 hours)

VI SEMESTER – 1 Credit (80 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to

1. Perform assessment of children: health, developmental & anthropometric.
2. Provide nursing care to children with various medical disorders.
3. Provide pre-& postoperative care to children with common pediatric surgical conditions/ malformation.
4. Perform immunization as per NIS.
5. Provide nursing care to critically ill children.
6. Give health education/nutritional education to parents.
7. Counsel parents according to identified counseling needs.

Skill Lab

Use of Manikins and Simulators PLS, CPAP, Endotracheal Suction

Pediatric Nursing Procedures:

- Administration of medication – Oral, IM & IV
- Oxygen administration
- Application of restraints
- Specimen collection
- Urinary catheterization and drainage
- Ostomy care
- Feeding – NG, gastrostomy, Jejunostomy
- Wound dressing
- Suture removal

CLINICAL POSTINGS
8 weeks × 30 hours per week (5 weeks + 3 weeks)

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods

Pediatric Medical Ward	**V Sem – 2 weeks**
	
	VI Sem – 1 week
		• Provide nursing care to children with various medical disorders	• Taking pediatric history
			• Physical examination & assessment of children
			• Administration of oral, I/M, & I/V medicine/fluids
			• Calculation of fluid replacement
			• Preparation of different strengths of I/V fluids
			• Application of restraints
			• Administration of O_2 inhalation by different methods
			• Baby bath/sponge bath
			• Feeding children by Katori spoon, Paladai cup
			• Collection of specimens for common investigations
			• Assisting with common diagnostic procedures
			• Teaching mothers/ parents
			  ○ Malnutrition
			  ○ Oral rehydration therapy
			  ○ Feeding & Weaning
			  ○ Immunization schedule
			• Play therapy
				• Nursing care plan – 1
				• Case study presentation – 1
				• Health talk – 1
					• Assess performance with rating scale
					• Assess each skill with checklist OSCE/OSPE
					• Evaluation of case study/ presentation & health education session
					• Completion of activity record

Pediatric Surgical Ward	**V Sem – 2 weeks** **VI Sem – 1 week**	• Recognize different pediatric surgical conditions/ malformations • Provide pre & post-operative care to children with common paediatric surgical conditions/ malformation • Counsel & educate parents	Calculation, preparation & administration of I/V fluids Bowel wash, insertion of suppositories Care for ostomies: Colostomy Irrigation Ureterostomy gastrostomy Enterostomy Urinary catheterization & drainage Feeding Naso-gastric Gastrostomy Jejunostomy Care of surgical wounds • Dressing Suture removal	• Nursing care plan – 1 • Case study/ presentation – 1	• Assess performance with rating scale • Assess each skill with checklist OSCE/OSPE • Evaluation of case study/ presentation • Completion of activity record
Pediatric OPD/ Immunization room	**V Sem – 1 week**	• Perform assessment of children: health, developmental & anthropometric • Perform immunization • Give health education/ nutritional education	• Assessment of children ○ Health assessment ○ Developmental assessment o Anthropometric assessment o Nutritional assessment • Immunization • Health/Nutritional education	• Growth and developmental study: Infant – 1 Toddler – 1 Preschooler – 1 Schooler – 1 Adolescent – 1	• Assess performance with rating scale • Completion of activity record.

NICU & PICU	**VI Sem – 1 week**	• Provide nursing care to critically ill children	• Care of a baby in incubator/warmer • Care of a child on ventilator, CPAP • Endotracheal Suction • Chest Physiotherapy • Administration of fluids with infusion pumps • Total Parenteral Nutrition • Phototherapy • Monitoring of babies • Recording & reporting • Cardiopulmonary Resuscitation (PLS)	• Newborn assessment – 1 • Nursing Care Plan – 1	Assess performance with rating scale • Evaluation of observation report • Completion of activity record

MENTAL HEALTH NURSING – I

PLACEMENT: V SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Clinical: 1 Credit (80 hours)

COURSE CODE: N-MHN(I)-305

COURSE DESCRIPTION: This course is designed to develop basic understanding of the principles and standards of mental health nursing and skill in application of nursing process in assessment and care of patients with mental health disorders.

COMPETENCIES: On completion of the course, the students will be competent to

1. Trace the historical development of mental health nursing and discuss its scope.
2. Identify the classification of the mental disorders.
3. Develop basic understanding of the principles and concepts of mental health nursing
4. Apply the Indian Nursing Council practice standards for psychiatric mental health nursing in supervised clinical settings.
5. Conduct mental health assessment.
6. Identify and maintain therapeutic communication and nurse patient relationship.
7. Demonstrate knowledge of the various treatment modalities and therapies used in mental disorders.
8. Apply nursing process in delivering care to patients with mental disorders.
9. Provide nursing care to patients with schizophrenia and other psychotic disorders based on assessment findings and treatment/therapies used.
10. Provide nursing care to patients with mood disorders based on assessment findings and treatment/therapies used.
11. Provide nursing care to patients with neurotic disorders based on assessment findings and treatment/ therapies used

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T)	Describe the historical development & current trends in mental health nursing Discuss the scope of mental health nursing Describe the concept of normal & abnormal behaviour	**Introduction** • Perspectives of Mental Health and Mental Health Nursing, evolution of mental health services, treatments and nursing practices • Mental health team • Nature & scope of mental health nursing • Role & functions of mental health nurse in various settings and factors affecting the level of nursing practice • Concepts of normal and abnormal behaviour	• Lecture cum Discussion	• Essay • Short answer
II	10 (T)	Define the various terms used in mental health Nursing Explain the classification of mental disorders Explain the psychodynamics of maladaptive behaviour Discuss the etiological factors & psychopathology of mental disorders Explain the principles and standards of Mental health Nursing Describe the conceptual models of mental health nursing	**Principles and Concepts of Mental Health Nursing** • Definition: mental health nursing and terminology used • Classification of mental disorders: ICD11, DSM5, Geropsychiatry manual classification • Review of personality development, defense mechanisms • Etiology bio-psycho-social factors • Psychopathology of mental disorders: review of structure and function of brain, limbic system and abnormal neurotransmission • Principles of Mental health Nursing • Ethics and responsibilities • Practice Standards for Psychiatric Mental Health Nursing (INC practice standards) • Conceptual models and the role of nurse: oExistential model ○ Psychoanalytical models ○ Behavioural model ○ Interpersonal model Preventive psychiatry and rehabilitation	• Lecture cum Discussion • Explain using Charts • Review of personality development	• Essay • Short answer

III	6 (T)	Describe nature, purpose and process of assessment of mental health status	**Mental Health Assessment** • History taking • Mental status examination • Mini mental status examination • Neurological examination • Investigations: Related Blood chemistry, EEG, CT & MRI • Psychological tests	• Lecture cum Discussion • Demonstration • Practice session • Clinical practice	• Essay • Short answer • Assessment of mental health status
IV	6 (T)	Identify therapeutic communication & techniques Describe therapeutic relationship Describe therapeutic impasses and its interventions	**Therapeutic Communication and Nurse- Patient Relationship** • Therapeutic communication: Types, techniques, characteristics and barriers • Therapeutic nurse-patient relationship • Interpersonal relationship- • Elements of nurse patient contract, • Review of technique of IPR- Johari window • Therapeutic impasse and its management	• Lecture cum Discussion • Demonstration • Role Play • Process recording • Simulation (video)	• Essay • Short answer • OSCE
V	10 (T)	Explain treatment modalities and therapies used in mental disorders and role of the nurse	**Treatment modalities and therapies used in mental disorders** • **Physical therapies**: Psychopharmacology, • Electro Convulsive therapy • **Psychological Therapies**: Psychotherapy, Behaviour therapy, CBT • **Psychosocial**: Group therapy, Family therapy, Therapeutic Community, Recreational therapy, Art therapy (Dance, Music etc), Occupational therapy • **Alternative & Complementary**: Yoga, Meditation, Relaxation • **Consideration for special populations**	• Lecture cum Discussion • Demonstration • Group work • Practice session • Clinical practice	• Essay • Short answer • Objective type

VI	8 (T)	Describe the etiology, psycho-dynamics/ pathology, clinical manifestations, diagnostic criteria and management of patients with Schizophrenia, and other psychotic disorders	**Nursing management of patient with Schizophrenia, and other psychotic disorders** • Prevalence and incidence • Classification • Etiology, psychodynamics, clinical manifestation, diagnostic criteria/formulations **Nursing process** • Nursing Assessment: History, Physical and mental assessment • Treatment modalities and nursing management of patients with Schizophrenia and other psychotic disorders • Geriatric considerations and considerations for special populations Follow up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
VII	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with mood disorders	**Nursing management of patient with mood disorders** • Prevalence and incidence • Mood disorders: Bipolar affective disorder, mania depression and dysthymia etc. • Etiology, psycho dynamics, clinical manifestation, diagnosis • Nursing Assessment History, Physical and mental assessment • Treatment modalities and nursing management of patients with mood disorders • Geriatric considerations/ considerations for special populations • Follow-up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems

VIII	8 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with neurotic, stress related and somatization disorders	**Nursing management of patient with neurotic, stress related and somatization disorders** • Prevalence and incidence • classifications • Anxiety disorders – OCD, PTSD, Somatoform disorders, Phobias, Dissociative and Conversion disorders • Etiology, psychodynamics, clinical manifestation, diagnostic criteria/ formulations • Nursing Assessment: History, Physical and mental assessment • Treatment modalities and nursing management of patients with neurotic and stress related disorders • Geriatric considerations/ considerations for special populations • Follow-up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient managemen t problems

CLINICAL PRACTICUM

MENTAL HEALTH NURSING - I & II

PLACEMENT: SEMESTER V & VI

MENTAL HEALTH NURSING - I – 1 Credit (80 hours)

MENTAL HEALTH NURSING - II – 2 Credits (160 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Assess patients with mental health problems/disorders
2. Observe and assist in various treatment modalities or therapies
3. Counsel and educate patients and families
4. Perform individual and group psychoeducation
5. Provide nursing care to patients with mental health problems/disorders
6. Motivate patients in the community for early treatment and follow up
7. Observe the assessment and care of patients with substance abuse disorders in deaddiction centre.

CLINICAL POSTINGS

(8 weeks × 30 hours per week = 240 hours)

Clinical Area/Unit	Duration (Weeks)	Learning Outcomes	Skills/Procedural Competencies	Clinical Requirements	Assessments Methods
Psychiatric OPD	2	Assess patients with mental health problems Observe and assist in therapies Counsel and educate patients, and families	• History taking • Perform mental status examination (MSE) • Observe/practice Psychometric assessment • Perform Neurological examination • Observing and assisting in therapies • Individual and group psycho- education • Mental hygiene practice education • Family psycho-education	• History taking and Mental status examination – 2 • Health education – 1 • Observation report of OPD	• Assess performance with rating scale • Assess each skill with checklist • Evaluation of health education • Assessment of observation report • Completion of activity record
Child Guidance clinic	1	Assess children with various mental health problems Counsel and educate children, families and significant others	• History & mental status examination • Observe/practice psychometric assessment • Observe and assist in various therapies • Parental teaching for child with mental deficiency		Assess performance with rating scale Assess each skill with checklist Evaluation of the observation report
Inpatient ward	4	• Assess patients with mental health problems • Provide nursing care for patients with various	• History taking • Mental status examination (MSE) • Neurological examination • Assisting in psychometric	• Give care to 2-3 patients with various mental disorders • Case study – 1	• Assess performance with rating scale • Assess each skill with checklist

		mental health problems • Assist in various therapies • Counsel and educate patients, families and significant others	assessment • Recording therapeutic communication • Administration of medications • Assist Electro-Convulsive Therapy (ECT) • Participating in all therapies • Preparing patients for Activities of Daily Living (ADL) • Conducting admission and discharge counselling • Counseling and teaching patients and families	• Care plan • Clinical presentation – 1 • Process recording – 2 • Maintain drug book	• Evaluation of the case study, care plan, clinical presentation, process recording • Completion of activity record
Community psychiatry & Deaddiction centre	1	• Identify patients with various mental disorders • Motivate patients for early treatment and follow up • Assist in follow up clinic • Counsel and educate patient, family and community • Observe the assessment and care of patients at deaddiction centre	• Conduct home visit and case work • Identifying individuals with mental health problems • Assisting in organizations of Mental Health camp • Conducting awareness meetings for mental health & mental illness • Counseling and Teaching family members, patients and community • Observing deaddiction care	• Case work – 1 • Observation report on field visits • Visit to deaddiction centre	• Assess performance with rating scale • Evaluation of case work and observation report • Completion of activity record

COMMUNITY HEALTH NURSING - I

including Environmental Science & Epidemiology

PLACEMENT: V SEMESTER

THEORY: 5 Credits (100 hours) includes Lab hours also

PRACTICUM: Clinical: 2 Credits (160 hours)

COURSE CODE: N-COMH(I)-310

COURSE DESCRIPTION: This course is designed to help students develop broad perspectives of health, its determinants, about community health nursing and understanding about the health care delivery services, health care policies and regulations in India. It helps the students to develop knowledge and understanding of environmental science. It further helps them to apply the principles and concepts of BCC and health education for health promotion and maintenance of health within the community in wellness and illness continuum. It helps students to practice Community Health Nursing for the individuals, family and groups at rural, urban and tribal settings by applying principles of community health nursing and epidemiological approach. It also helps the students to develop knowledge and competencies required to screen, assess, diagnose, manage and refer clients appropriately in various health care settings. It prepares the students to provide primary healthcare to clients of all ages in the community, DH, PHC, CHC, SC/HWC and develop beginning skills in participating in all the National Health Programs.

COMPETENCIES: On completion of the course, the students will be able to

1. Explore the evolution of public health in India and community health nursing
2. Explain the concepts and determinants of health
3. Identify the levels of prevention and health problems of India
4. Develop basic understanding about the health care planning and the present health care delivery system in India at various levels
5. Locate the significance of primary health care and comprehensive primary health care as part of current health care delivery system focus
6. Discuss health care policies and regulations in India
7. Demonstrate understanding about an overview of environmental science, environmental health and sanitation
8. Demonstrate skill in nutritional assessment for different age groups in the community and provide appropriate nutritional counseling
9. Provide health education to individuals and families applying the principles and techniques of behavior change appropriate to community settings

10. Describe community health nursing approaches and concepts
11. Describe the role and responsibilities of community health nursing personnel
12. Utilize the knowledge and skills in providing comprehensive primary health care across the life span at various settings
13. Make effective home visits applying principles and methods used for home visiting
14. Use epidemiological approach in community diagnosis
15. Utilize the knowledge of epidemiology, epidemiological approaches in caring for people with communicable and non- communicable diseases
16. Investigate an epidemic of communicable diseases
17. Assess, diagnose, manage and refer clients for various communicable and non- communicable diseases appropriately at the primary health care level
18. Identify and perform the roles and responsibilities of nurses in implementing various national health programs in the community for the prevention, control and management of communicable and non-communicable diseases particularly in screening, identification, primary management and referral to a health facility/First Referral Unit (FRU)

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4 (T)	Define public health, community health and community health nursing Explain the evolution of public health in India and scope of community health nursing Explain various concepts of health and disease, dimensions and determinants of health Explain the natural history of disease and levels of prevention Discuss the health problems of India	**Concepts of Community Health and Community Health Nursing** • Definition of public health, community health and community health nursing • Public health in India and its evolution and Scope of community health nursing • *Review:* Concepts of Health & Illness/ disease: Definition, dimensions and determinants of health and disease • Natural history of disease Levels of prevention: Primary, Secondary & tertiary prevention – Review • Health problems (Profile) of India	• Lecture • Discussion • Explain using chart, graphs • Community needs assessment (Field survey on identification of demographic characteristics, health determinants and resources of a rural and an urban community) • Explain using examples	• Short answer • Essay • Objective type • Survey report
II	8 (T)	Describe health planning and its steps, and various health plans, and committees	**Health Care Planning and Organization of Health Care at various levels** • Health planning steps • Health planning in India: various committees and commissions on health and family welfare and Five-Year plans	• Lecture • Discussion • Field visits to CHC, PHC, SC/ Health Wellness Centers (HWC)	• Short answer • Essay Evaluation of Field visit reports & presentation

		Discuss health care delivery system in India at various levels Describe SDGs, primary health care and comprehensive primary health care (CPHC) Explain health care policies and regulations in India	• Participation of community and stakeholders in health planning • Health care delivery system in India: Infrastructure and Health sectors, Delivery of health services at sub-centre (SC), PHC, CHC, District level, state level and national level • Sustainable development goals (SDGs), Primary Health Care and Comprehensive Primary Health Care (CPHC): elements, principles • CPHC through SC/Health Wellness Center (HWC) • Role of MLHP/CHP • National Health Care Policies and Regulations ○ National Health Policy (1983, 2002, 2017) ○ National Health Mission (NHM): National Rural Health Mission (NRHM), National Urban Health Mission (NUHM), NHM ○ National Health Protection Mission (NHPM) ○ Ayushman Bharat ○ Universal Health Coverage	• Directed reading	

III	15 (T)	Identify the role of an individual in the conservation of natural resources Describe ecosystem, its structure, types and functions	**Environmental Science, Environmental Health, and Sanitation** • *Natural resources:* Renewable and non-renewable resources, natural resources and associated problems: Forest resources, water resources, mineral resources, food resources, energy resources and land resources • Role of individuals in conservation of natural resources, and equitable use of resources for sustainable lifestyles • *Ecosystem:* Concept, structure and functions of ecosystems, Types & Characteristics – Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem, Energy flow in ecosystem	• Lecture Discussion • Debates on environmental protection and preservation • Explain using Charts, graphs, Models, films, slides	• Short answer • Essay • Field visit reports

		Explain the classification, value and threats to biodiversity Enumerate the causes, effects and control measures of environmental pollution Discuss about climate change, global warming, acid rain, and ozone layer depletion Enumerate the role of an individual in creating awareness about the social issues related to environment List the Acts related to environmental protection and preservation Describe the concept of environmental health and sanitation	• *Biodiversity:* Classification, value of bio-diversity, threats to biodiversity, conservation of biodiversity • *Environmental pollution:* Introduction, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards & their impact on health • *Climate change, global warming:* ex. heat wave, acid rain, ozone layer depletion, waste land reclamation & its impact on health • *Social issues and environment:* sustainable development, urban problems related to energy, water and environmental ethics • Acts related to environmental protection and preservation **Environmental Health & Sanitation** • Concept of environment health and sanitation • Concept of safe water, sources of water, waterborne diseases, water purification processes, household purification of water	• Directed reading • Visits to water supply Observe rain water harvesting plants • & purification sites • Observe rain water harvesting plants	

		Describe water conservation, rain water harvesting and water shed management Explain waste management	• Concepts of water conservation: rain water harvesting and water shed management • Solid waste management, human excreta disposal & management and sewage disposal and management • Commonly used insecticides and pesticides	Visit to sewage disposal and treatment sites, and waste disposal sites	
IV	7 (T)	Describe the various nutrition assessment methods at the community level Plan and provide diet plans for all age groups including therapeutic diet Provide nutrition counseling and education to all age groups and describe the national nutrition programs	**Nutrition Assessment and Nutrition Education** • *Review of Nutrition* • Concepts, types • Meal planning: aims, steps & diet plan for different age groups • Nutrition assessment of individuals, families and community by using appropriate methods • Planning suitable diet for individuals and families according to local availability of foods, dietary habits and economic status • General nutritional advice • Nutrition education: purpose, principles & methods and Rehabilitation	• Lecture • Discussion • Demonstration • Role play • Market visit • Nutritional assessment for different age groups • Lecture • Discussion	Performance assessment of nutrition assessment for different age groups Evaluation on nutritional assessment reports • Short answer • Essay

		Identify early the food borne diseases, and perform initial management and referral appropriately	• *Review:* Nutritional deficiency disorders • National nutritional policy • & programs in India **Food Borne Diseases and Food Safety** **Food borne diseases** • Definition, & burden, Causes and classification • Signs & Symptoms • Transmission of food borne pathogens & toxins • Early identification, initial management and referral **Food poisoning & food intoxication** • Epidemiological features/clinical characteristics, Types of food poisoning • Food intoxication-features, preventive & control measures • Public health response to food borne diseases	• Field visits to milk purification plants, slaughterhouse • Refer Nutrition module-BPCCHN Block 2-unit I & UNIT 5	• Field visit reports

VI	7 (T)	Describe behaviour change communication skills Counsel and provide health education to individuals, families and community for promotion of healthy life style practices using appropriate methods and media	**Communication management and Health Education** ○ Behaviour change communication skills • communication ○ Human behaviour ○ Health belief model: concepts & definition, ways to influence behaviour ○ Steps of behaviour change ○ Techniques of behaviour change: Guiding principles in planning BCC activity ○ Steps of BCC ○ Social and Behaviour Change Communication strategies (SBCC): techniques to collect social history from clients ○ Barriers to effective ○ communication, and methods to overcome them ○ Health promotion and Health education: methods/techniques, and audio-visual aids	○ Lecture ○ Discussion ○ Role play ○ Demonstration: BCC skills ○ Supervised field practice ○ Refer: BCC/SBCC module (MoHFW & USAID)	• Short answer • Essay Performance evaluation of health education sessions to individuals and families
VI	7 (T)	Describe community health nursing approaches and concepts	**Community health nursing approaches, concepts, roles and responsibilities of community health nursing personnel** **Approaches:** • Nursing process • Epidemiological approach • Problem solving approach • Evidence based approach • Empowering people to care for themselves • *Review:* Primary health care and Comprehensive Primary Health Care (CPHC)	• Lecture • Discussion • Demonstration • Role plays	• Short answer • Essays

		Describe and identify the activities of community health nurse to promote and maintain family health through home visits	**Home Visits**: • Concept, Principles, Process, & Techniques: Bag technique • Qualities of Community HealthNurse • Roles and responsibilities of community health nursing personnel in family health services • *Review:* Principles & techniques of counseling	• Supervised field practice	• Assessment of supervised field practice
VII	10 (T)	Explain the specific activities of community health nurse in assisting individuals and groups to promote and maintain their health	**Assisting individuals and families to promote and maintain their health** ○ *Assessment of individuals and families* (Review from Child health nursing, Medical surgical nursing and OBG Nursing) • Assessment of children, women, adolescents, elderly etc. • Children: Monitoring growth and development, milestones • Anthropometric measurements, BMI • Social development • Temperature and Blood pressure monitoring • Menstrual cycle • Breast self-examination (BSE) and testicles self-examination (TSE) • Warning Signs of various diseases • Tests: Urine for sugar and albumin, blood sugar, Hemoglobin	• Lecture • Discussion • Demonstration • Role plays	• Short answer • Essay • Assessment of clinical performance in the field practice area • Assessment of procedural skills in lab procedures

		Provide primary care at home/ health centers (HWC) using standing orders/ protocols as per public health standards/approved by MoH&FW and INC regulation	*B. Provision of health services/primary health care:*
			• Routine check-up, Immunization, counseling, and diagnosis
			• Management of common diseases at home and health centre level
			  ○ Care based on standing orders/protocols approved by MoH&FW
			  ○ Drugs dispensing and injections at health centre
			C. Continue medical care and follow up in community for various diseases/disabilities
			D. Carry out therapeutic procedures as prescribed/required for client and family
			E. Maintenance of health records and reports
			• Maintenance of client records
			• Maintenance of health records at the facility level
			• Report writing and documentation of activities carried out during home visits, in the clinics/centers and field visits
					• Evaluation of records and reorts

		Develop beginning skills in handling social issues affecting the health and development of the family Identify and assist the families to utilize the community resources appropriately	• F. Sensitize and handle social issues affecting health and development of the family • Women empowerment • Women and child abuse • Abuse of elders • Female feticide • Commercial sex workers • Substance abuse • Utilize community resources for client and family • Trauma services • Old age homes • Orphanages • Homes for physically challenged individuals • Homes for destitute • Palliative care centres • Hospice care centres • Assisted living facility	• Family records • Health center records • Field visits	• Evaluation of field visit reports
VIII	10 (T)	Describe the concepts, approaches and methods of epidemiology	**Introduction to Epidemiology – Epidemiological Approaches and Processes** • Epidemiology: Concept and Definition • Distribution and frequency of disease • Aims & uses of epidemiology • Epidemiological models of causation of disease • Concepts of disease transmission • Modes of transmission: Direct, Indirect and chain of infection • Time trends or fluctuations in disease occurrence • Epidemiological approaches: Descriptive, analytical and experimental Principles of control measures/levels of prevention of disease	• Lecture • Discussion • Demonstration • Role play • Field visits: communicable disease hospital & Entomology office	• Short answer • Essay • Report on visit to communicable disease hospital • Report on visit to entomology office

		Investigate an epidemic of communicable disease	• Investigation of an epidemic of communicable disease • Use of basic epidemiological tools to make community diagnosis for effective planning and intervention	• Investigation of an epidemic of communicable disease	• Report and presentation on investigating an epidemic of communicable disease
IX	15 (T)	Explain the epidemiology of specific communicable diseases Describe the various methods of prevention, control and management of communicable diseases and the role of nurses in screening, diagnosing, primary management and referral to a health facility	**Communicable Diseases and National Health Programs** ○ *Communicable Diseases – Vector borne diseases (Every disease will be dealt under the following headlines)* • Epidemiology of the following vector born diseases • Prevention & control measures • Screening, and diagnosing the following conditions, primary management, referral and follow up • Malaria • Filaria • Kala-azar • Japanese encephalitis • Dengue • Chickungunya ○ *Communicable diseases: Infectious diseases (Every disease will be dealt under the following headlines)* • Epidemiology of the following infectious diseases • Prevention & Control measures • Screening, diagnosing the following conditions, primary management, referral and follow up • Leprosy • Tuberculosis • Vaccine preventable diseases – Diphtheria, whooping cough, tetanus, poliomyelitis and measles	• Lecture • Discussion, • Demonstration • Role play • Suggested field visits • Field practice • Assessment of clients with communicable diseases	• Field visit reports • Assessment of family case study • OSCE assessment • Short answer • Essay

			oEnteric fever oViral hepatitis HIV/AIDS/RTI infections HIV/AIDS, and Sexually Transmitted Diseases/ Reproductive tract infections (STIs/RTIs) Diarrhoea Respiratory tract infections COVID-19 Helminthic – soil & food transmitted and parasitic infections – Scabies and pediculosis **3**. *Communicable diseases: Zoonotic diseases* Epidemiology of Zoonotic diseases Prevention & control measures Screening and diagnosing the following conditions, primary management, referral and follow up oRabies: Identify, suspect, primary management and referral to a health facility Role of a nurses in control of communicable diseases **National Health Programs**		
		Identify the national health programs relevant to communicable diseases and explain the role of nurses in implementation of these programs	UIP: Universal Immunization Program (Diphtheria, Whooping cough, Tetanus, Poliomyelitis, Measles and Hepatitis B) National Leprosy Eradication Program (NLEP) 1. Revised National Tuberculosis Control Program (RNTCP) Integrated Disease Surveillance Program (IDSP): Enteric fever, Diarrhea, Respiratory infections and Scabies		

			• National Aids Control Organization (NACO) • National Vector Borne Disease Control Program • National Air Quality Monitoring Program • Any other newly added program		
X	15 (T)	Describe the national health program for the control of non-communicable diseases and the role of nurses in screening, identification, primary management and referral to a health facility	**Non-Communicable Diseases and National Health Program (NCD)** National response to NCDs (Every disease will be dealt under the following headlines Epidemiology of specific diseases Prevention and control measures Screening, diagnosing/ identification and primary management, referral and follow up care **NCD-1** Diabetes Mellitus Hypertension Cardiovascular diseases Stroke & Obesity **Blindness**: Categories of visual impairment and national program for control of blindness **Deafness:** national program for prevention and control of deafness **Thyroid diseases** **Injury and accidents:** Risk factors for Road traffic injuries and operational guidelines for trauma care facility on highways **NCD-2 Cancers** ○ cervical Cancer o Breast Cancer ○ Oral cancer Epidemiology of specific cancers, Risk factors/ Causes, Prevention, Screening, diagnosis – signs, Signs & symptoms, and early management & referral Palliative care Role of a nurse in non-communicable disease control program	○ Lecture ○ Discussion ○ Demonstration ○ Role play ○ Suggested field visits ○ Field practice ○ Assessment of clients with non-communicable diseases	○ Field visit reports ○ Assessment of family case study ○ OSCE assessment ○ Short answer ○ Essay

			National Health Programs • National program for prevention and control of cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) • National program for control of blindness • National program for prevention and control of deafness • National tobacco control program • **Standard treatment protocols used in National Health Programs**	Participation in national health programs	
XI	3 (T)	Enumerate the school health activities and the role functions of a school health nurse	**School Health Services** • Objectives • Health problems of school children • Components of school health services • Maintenance of school health records • Initiation and planning of school health services • Role of a school health nurse	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	○ Short answer ○ Essay ○ Evaluation of health counseling to school children ○ Screen, diagnose, manage and refer school children ○ OSCE assessment

Note: Lab hours less than 1 Credit is not specified separately.

CLINICAL PRACTICUM

CLINICAL: 2 Credits (160 hours)

CLINICAL POSTINGS: (4 weeks × 40 hours per week)

Clinical Area/Unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Urban	2 weeks	Build and maintain rapport	• Interviewing skills using communication and interpersonal relationship	• Community needs assessment/ Survey – Rural/urban – 1	• Evaluation of survey report
Rural	2 Weeks	Identify the socio-demographic characteristics, health determinants and resources of a rural and an urban community	Conducting community needs assessment/survey to identify health determinants of a community	Field visits: SC/HWC, PHC, CHC Water resources & purification site – water quality standards Rain water harvesting Sewage disposal Observation of milk diary slaughterhouse – meat hygiene	Evaluation of field visit and observation reports
		Observe the functioning and document significant observations	Observation skills	Observation of nutrition programs Visit to market	
		Perform nutritional assessment and plan diet plan for adult	Nutritional assessment skills	Nutritional assessment of an individual (adult) – 1 Health teaching (Adult) – 1 Use of audio-visual aids Flash cards Posters Flannel graph Flip charts	
		Educate individuals/ family/community on Nutrition Hygiene Food hygiene Healthy lifestyle Health promotion	Skill in teaching individual/family on: Nutrition, including food hygiene and safety Healthy lifestyle Health promotion	Health assessment of woman – 1, infant/under five – 1, adolescent – 1, adult – 1 Growth monitoring of under-five children – 1	Health talk evaluation
		Perform health assessment for clients of various age groups	Health assessment including nutritional assessment for clients of different age groups	**Document and maintain**: Individual record Family record Health center record Community health survey to investigate an epidemic – 1	Assessment of clinical performance ○ Evaluations of reports & records
			Documentation skills		

		○ Investigate epidemic of communicable disease ○ Identify prevalent communicable and non-communicable diseases ○ Screen, diagnose, manage and refer clients with common health problems in the community and refer high risk clients using standing orders/protocols ○ Participate in implementation of national health programs ○ Participate in school health program	○ Investigating an epidemic – Community health survey ○ Screening, diagnosing, primary management of common health problems in the community and referral of high-risk clients to FRUs ○ Conduct home visit ○ Participation in implementation of national health programs ○ Participation in school health program	○ **Screening, diagnosing and primary management and referral**: ○ Communicable disease – 1 ○ Non-communicable diseases – 1 ○ Home visits – 2 ○ Participation in any two national health programs ○ Participation in school health program – 1	○ Clinical performance assessment ○ OSCE ○ Final clinical examination ○ Evaluation of home visit

EDUCATIONAL TECHNOLOGY/NURSING EDUCATION

PLACEMENT: V SEMESTER
THEORY: 2 Credits (40 hours)

PRACTICUM: Lab/Practical: 1 Credit (40 hours)

COURSE CODE: EDUC 315

COURSE DESCRIPTION: This course is designed to help the students to develop knowledge, attitude and beginning competencies essential for applying basic principles of teaching and learning among individuals and groups both in educational and clinical settings. It also introduces basics of curriculum planning and organization. It further enables students to participate actively in team and collaborative learning.

COMPETENCIES: On completion of the course, the students will be competent to

1. Develop basic understanding of theoretical foundations and principles of teaching and learning
2. Identify the latest approaches to education and learning
3. Initiate self- assessment to identify one's own learning styles
4. Demonstrate understanding of various teaching styles that can be used, based on the learners 'readiness and generational needs
5. Develop understanding of basics of curriculum planning, and organizing
6. Analyze and use different teaching methods effectively that are relevant to student population and settings
7. Make appropriate decisions in selection of teaching learning activities integrating basic principles
8. Utilize active learning strategies that enhance critical thinking, team learning and collaboration
9. Engage in team learning and collaboration through inter professional education
10. Integrate the principles of teaching and learning in selection and use of educational media/technology
11. Apply the principles of assessment in selection and use of assessment and evaluation strategies
12. Construct simple assessment tools/tests integrating cognitive, psychomotor and affective domains of learning that can measure knowledge and competence of students
13. Develop basic understanding of student guidance through mentoring and academic advising
14. Identify difficult situations, crisis and disciplinary/grievance issues experienced by students and provide appropriate counseling
15. Engage in ethical practice in educational as well as clinical settings based on values, principles and ethical standards
16. Develop basic understanding of evidence-based teaching practice

COURSE OUTLINE

T – Theory, P – Practical (Laboratory)

Unit	Time (Hrs.)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	6	3	• Explain the definition, aims, types, approaches and scope of educational technology • Compare and contrast the various educational philosophies • Explain the teaching learning process, nature, characteristics and principles	**Introduction and Theoretical Foundations:** • *Education and educational technology* • Definition, aims • Approaches and scope of educational technology • Latest approaches to education: o Transformational education oRelationship based education oCompetency based education • *Educational philosophy:* • Definition of philosophy, education and philosophy • Comparison of educational philosophies • Philosophy of nursing education • *Teaching learning process:* • Definitions • Teaching learning as a process • Nature and characteristics of teaching and learning • Principles of teaching and learning • Barriers to teaching and learning • Learning theories • Latest approaches to learning • oExperiential learning	• Lecture cum discussion	• Quiz

				• Reflective learning • Scenario based learning • Simulation based learning • Blended learning	**Group exercise**: Create/discuss scenario-based exercise	**Assessment of Assignment:** Learning theories – analysis of any one
II	6	6	Identify essential qualities/attributes of a teacher Describe the teaching styles of faculty Explain the determinants of learning and initiates self-assessment to identify own learning style Identify the factors that motivate the learner Define curriculum and classify types Identify the factors influencing curriculum development Develop skill in writing learning outcomes, and lesson plan	**Assessment and Planning** ***Assessment of teacher*** • Essential qualities of a teacher • Teaching styles – Formal authority, demonstrator, facilitator, delegator *Assessment of learner* • Types of learners • Determinants of learning – learning needs, readiness to learn, learning styles • Today's generation of learners and their skills and attributes • Emotional intelligence of the learner • Motivational factors – personal factors, environmental factors and support system • Curriculum Planning • Curriculum – definition, types • Curriculum design – components, approaches • Curriculum development – factors influencing curriculum development, facilitators and barriers • Writing learning outcomes/ behavioral objectives • Basic principles of writing course plan, unit plan and lesson plan	Lecture cum discussion Self-assessment exercise: Identify your learning style using any learning style inventory (ex. Kolb's learning style inventory) Lecture cum discussion Individual/group exercise: Writing learning outcomes Preparation of a lesson plan	Short answer Objective type Assessment of Assignment: Individual/ Group
III	8	15	Explain the principles and strategies of classroom management	**Implementation** *Teaching in Classroom and Skill lab* – • *Teaching Methods* • Classroom management-principles and strategies • Classroom communication • oFacilitators and Barriers to classroom communication	• Lecture cum Discussion	• Short answer • Objective type

			Describe different methods/strategies of teaching and develop beginning skill in using various teaching methods Explain active learning strategies and participate actively in team and collaborative learning	oInformation communication technology (ICT) – ICT used in education *Teaching methods – Features, advantages and disadvantages* Lecture, Group discussion, microteaching Skill lab – simulations, Demonstration & re-demonstration Symposium, panel discussion, seminar, scientific workshop, exhibitions Role play, project Field trips Self-directed learning (SDL) Computer assisted learning One-to-one instruction *Active learning strategies* Team based learning Problem based learning Peer sharing Case study analysis Journaling Debate Gaming Inter-professional education	Practice teaching/Micro teaching Exercise (Peer teaching) Patient teaching session Construction of game – puzzle Teaching in groups – interdisciplinary	Assessment of microteaching
IV	3	3	Enumerate the factors influencing selection of clinical learning experiences Develop skill in using different clinical teaching strategies	**Teaching in the Clinical Setting – Teaching Methods** • Clinical learning environment • Factors influencing selection of clinical learning experiences • Practice model • Characteristics of effective clinical teacher • Writing clinical learning outcomes/practice competencies • Clinical teaching strategies – patient assignment – clinical conference, clinical presentation/bedside clinic, Case study/care study, nursing rounds, concept mapping, project, debate, game, role play, PBL, questioning, written assignment, process recording	• Lecture cum discussion Writing clinical outcomes – assignments in pairs	• Short answer Assessment of written assignment

V	5	5	Explain the purpose, principles and steps in the use of media Categorize the different types of media and describe its advantages and disadvantages Develop skill in preparing and using media	**Educational/Teaching Media** • Media use – Purpose, components, principles and steps • Types of media *Still visuals* o Non projected – drawings & diagrams, charts, graphs, posters, cartoons, board devices (chalk/white board, bulletin board, flannel board, flip charts, flash cards, still pictures/photographs, printed materials-handout, leaflet, brochure, flyer o Projected – film stripes, microscope, power point slides, overhead projector *Moving visuals* o Video learning resources – videotapes & DVD, blu-ray, USB flash drive o Motion pictures/films *Realia and models* o Real objects & Models *Audio aids/audio media* o Audiotapes/Compact discs o Radio & Tape o recorder oPublic o address system o Digital audio *Electronic media/computer learning resources* o Computers o Web-based videoconferencing o E-learning, Smart classroom *Telecommunication (Distance education)* o Cable TV, satellite broadcasting, videoconferencing Telephones – Telehealth/telenursing *Mobile technology*	• Lecture cum discussion • Preparation of different teaching aids – (Integrate with practice teaching sessions)	• Short answer • Objective type • Assessment of the teaching media prepared

VI	5	3	Describe the purpose, scope, principles in selection of evaluation methods and barriers to evaluation Explain the guidelines to develop assessment tests Develop skill in construction of different tests Identify various clinical evaluation tools and demonstrate skill in selected tests	**Assessment/Evaluation Methods/Strategies** • Purposes, scope and principles in selection of assessment methods and types • Barriers to evaluation Guidelines to develop assessment tests *Assessment of knowledge*: • Essay type questions, • Short answer questions (SAQ) • Multiple choice questions (MCQ – single response & multiple response) *Assessment of skills:* • Clinical evaluation • Observation (checklist, rating scales, videotapes) • Written communication – progress notes, nursing care plans, process recording, written assignments • Verbal communication (oral examination) • Simulation • Objective Structured Clinical Examination (OSCE) • Self-evaluation • Clinical portfolio, clinical logs *Assessment of Attitude:* • Attitude scales *Assessment tests for higher learning*: • Interpretive questions, hot spot questions, drag and drop and ordered response questions	• Lecture cum discussion Exercise on constructing assessment tool/s	• Short answer • Objective type Assessment of tool/s prepared

VII	3	3	Explain the scope, purpose and principles of guidance Differentiate between guidance and counseling Describe the principles, types, and counseling process Develop basic skill of counseling and guidance Recognize the importance of preventive counseling and develop skill to respond to disciplinary problems and grievance among students	**Guidance/academic advising, counseling and discipline** *Guidance* Definition, objectives, scope, purpose and principles Roles of academic advisor/ faculty in guidance *Counseling* Difference between guidance and counseling Definition, objectives, scope, principles, types, process and steps of counseling Counseling skills/techniques – basics Roles of counselor Organization of counseling services Issues for counseling in nursing students *Discipline and grievance in students* Managing disciplinary/grievance problems – preventive guidance & counseling Role of students'grievance redressal cell/committee	Lecture cum discussion Role play on student counseling in different situations Assignment on identifying situations requiring counseling	Assessment of performance in role play scenario Evaluation of assignment
VIII	4	2	Recognize the importance of value- based education Develop skill in ethical decision making and maintain ethical standards for students Introduce knowledge of EBT and its application in nursing education	**Ethics and Evidence Based Teaching (EBT) in Nursing Education** *Ethics – Review* • Definition of terms • Value based education in nursing • Value development strategies • Ethical decision making • Ethical standards for students • Student-faculty relationship *Evidence based teaching – Introduction* • Evidence based education process and its application to nursing education	• Value clarification exercise • Case study analysis (student encountered scenarios) and suggest ethical decision-making steps • Lecture cum discussion	• Short answer • Evaluation of case study analysis • Quiz – MCQ

INTRODUCTION TO FORENSIC NURSING AND INDIAN LAWS

PLACEMENT: V SEMESTER

THEORY: 1 Credit (20 hours)
COURSE CODE: N-FORN-320

COURSE DESCRIPTION: This course is designed to help students to know the importance of forensic science in total patient care and to recognize forensic nursing as a specialty discipline in professional nursing practice.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify forensic nursing as an emerging specialty in healthcare and nursing practice
2. Explore the history and scope of forensic nursing practice
3. Identify forensic team, role and responsibilities of forensic nurse in total care of victim of violence and in preservation of evidence
4. Develop basic understanding of the Indian judicial system and legal procedure

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	3 (T)	Describe the nature of forensic science and discus issues concerning violence	**Forensic Science** • Definition • History • Importance in medical science • Forensic Science Laboratory **Violence** • Definition • Epidemiology • Source of data	• Lecture cum discussion • Visit to Regional Forensic Science Laboratory	• Quiz – MCQ • Write visit report
II	2 (T)	Explain concepts of forensic nursing and scope of practice for forensic nurse	**Forensic Nursing** • Definition • History and development • Scope – setting of practice, areas of practice and subspecialties • Ethical issues • Roles and responsibilities of nurse • INC & SNC Acts	• Lecture cum discussion	• Short answer • Objective type
III	7 (T)	Identify members of forensic team and describe role of forensic nurse	**Forensic Team** • Members and their roles **Comprehensive forensic nursing care of victim and family** • Physical aspects • Psychosocial aspects • Cultural and spiritual aspects • Legal aspects • Assist forensic team in care beyond scope of her practice • Admission and discharge/referral/death of victim of violence • Responsibilities of nurse as a witness **Evidence preservation – role of nurses** • Observation • Recognition	• Lecture cum Discussion • Hypothetical/ • real case presentation • Observation of post- mortem • Visit to department of forensic medicine	• Objective type • Short answer • Write report

			• Collection • Preservation • Documentation of Biological and other evidence related to criminal/traumatic event • Forwarding biological samples for forensic examination		
IV	3 (T)	Describe fundamental rights and human rights commission	**Introduction of Indian Constitution** **Fundamental Rights** • Rights of victim • Rights of accused **Human Rights Commission**	• Lecture cum discussion • Written Assignment • Visit to prison	• Short answer • Assessment of written assignment • Write visit report
V	5 (T)	Explain Indian judicial system and laws Discuss the importance of POSCO Act	**Sources of laws and law-making powers** **Overview of Indian Judicial System** • JMFC (Judicial Magistrate First Class) • District • State • Apex **Civil and Criminal Case Procedures** • IPC (Indian Penal Code) • ICPC • IE Act (Indian Evidence Act) **Overview of POSCO Act**	• Lecture cum discussion • Guided reading • Lecture cum discussion	• Quiz • Short answer

SYLLABUS

VI SEMESTER

B.Sc. NURSING

CHILD HEALTH NURSING - II

PLACEMENT: VI SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICUM: Clinical: 1 Credit (80 hours)

COURSE CODE: N CHN(II) 301

COURSE DESCRIPTION: This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathophysiology and provide nursing care to children with Cardiovascular, GI, genitourinary, nervous system disorders, orthopedic disorders, eye, ear and skin disorders and communicable diseases
2. Provide care to children with common behavioral, social and psychiatric problems
3. Manage challenged children
4. Identify the social and welfare services for challenged children

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	20 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with disorders of cardiovascular, gastrointestinal, genitourinary, and nervous system	**Cardiovascular system:** • Identification and Nursing management of congenital malformations • Congenital heart diseases: Cyanotic and Acyanotic (ASD, VSD, PDA,TOF) • Others: Rheumatic fever and Rheumatic heart disease, Congestive cardiac failure • Hematological condition02s: • Congenital: Hemophilia, • Thalassemia • Others: Anemia, Leukemia, Idiopathic thrombocytopenic purpura, Hodgkin's and non-Hodgkin lymphoma • **Gastro-intestinal system:** • Identification and Nursing management of congenital malformations. • Congenital: Cleft lip, Cleft palate, Congenital hypertrophic pyloric stenosis, Hirschsprungs disease (Megacolon), Anorectal malformation, Malabsorption syndrome, Abdominal wall defects, Hernia • Others: Gastroenteritis, Diarrhea, Vomiting, Protein energy malnutrition, Intestinal obstruction, Hepatic diseases, intestinal parasites • **Genitourinary urinary system:** • Identification and Nursing management of congenital malformations. • Congenital: Wilms tumor, Extropy of bladder, Hypospadias, Epispadias, Obstructive uropathy • Others: Nephrotic syndrome, Acute glomerulonephritis, renal failure • **Nervous system:** • Identification and Nursing management of congenital malformations • Congenital: Spina bifida, Hydrocephalous. • Others: Meningitis, Encephalitis, Convulsive disorders (convulsions and seizures), Cerebral palsy head injury	• Lecture cum discussion • Demonstration and practice session • Refer/Consult SAM operational guidelines on facility-based management of children with severe acute malnutrition	• Short answer • Objective type • Assessment of skills with checklist

II	10 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with Orthopedic disorders, eye, ear and skin disorders Explain the preventive measures and strategies for children with communicable diseases	**Orthopedic disorders**: • Club foot • Hip dislocation and • Fracture • Disorder of eye, ear and skin: • Refractory errors • Otitis media and • Atopic dermatitis • Communicable diseases in children, their identification/ diagnosis, nursing management in hospital, in home, control • & prevention: • Tuberculosis • Diphtheria • Tetanus • Pertussis • Poliomyelitis • Measles • Mumps, and • Chickenpox • HIV/AIDS • Dengue fever • COVID-19	• Lecture cum discussion • Demonstration • Practice session • Clinical practice	• Short answer • Objective type • Assessment of skills with checklist
III	10 (T)	Describe the management of children with behavioral & social problems Identify the social & welfare services for challenged children	**Management of behavior and social problems in children** • Child Guidance clinic • Common behavior disorders in children and management ○ Enuresis and Encopresis ○ Nervousness ○ Nail biting ○ Thumb sucking ○ Temper tantrum ○ Stealing ○ Aggressiveness ○ Juvenile delinquency ○ School phobia ○ Learning disability	• Lecture cum discussion • Field visits to child guidance clinics, school for mentally • & physically, socially challenged	• Short answer • Objective type • Assessment of field reports

			• **Psychiatric disorders in children and management** ○ Childhood schizophrenia ○ Childhood depression ○ Conversion reaction ○ Posttraumatic stress disorder ○ Autistic spectrum disorders ○ Eating disorder in children and management ○ Obesity ○ Anorexia nervosa ○ Bulimia ○ Management of challenged children. ○ Mentally ○ Physically ○ Socially ○ Child abuse, ○ Substance abuse ○ Welfare services for challenged children in India		

CHILD HEALTH NURSING - II – CLINICAL PRACTICUM (1 Credit – 80 hours)

Given under Child Health Nursing - I as I & II

MENTAL HEALTH NURSING – II

PLACEMENT: VI SEMESTER

THEORY: 1 Credit (40 Hours)

PRACTICUM: Clinical: 2 Credits (160 Hours)

COURSE CODE: N-MHN(II)-305

COURSE DESCRIPTION: This course is designed to provide the students with basic understanding and skills essential to meet psychiatric emergencies and perform the role of community mental health nurse.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply nursing process in providing care to patients with substance use disorders, and personality and sexual disorders.
2. Apply nursing process in providing care to patients with behavioral and emotional disorders occurring during childhood and adolescence.
3. Apply nursing process in providing care to patients with organic brain disorders.
4. Identify and respond to psychiatric emergencies.
5. Carry out crisis interventions during emergencies under supervision.
6. Perform admission and discharge procedures as per MHCA 2017.
7. Explore the roles and responsibilities of community mental health nurse in delivering community mental health services.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with substance use disorders	**Nursing Management of Patients with Substance Use Disorders** • Prevalence and incidence • Commonly used psychotropic substance: classifications, forms, routes, action, intoxication and withdrawal • Psychodynamics/etiology of substance use disorder (Terminologies: Substance Use, Abuse, Tolerance, Dependence, Withdrawal) • Diagnostic criteria/formulations • Nursing Assessment: History (substance history), Physical, mental assessment and drug and drug assay • Treatment (detoxification, Antabuse and narcotic antagonist therapy and harm reduction, Brief interventions, MET, refusal skills, maintenance therapy) and nursing management of patients with substance use disorders • Special considerations for vulnerable population • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
II	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with personality, and sexual disorders	**Nursing Management of Patient with Personality and Sexual Disorders** • Prevalence and incidence • Classification of disorders • Etiology, psychopathology, characteristics, diagnosis • Nursing Assessment: History, Physical and mental health assessment • Treatment modalities and nursing management of patients with personality, and sexual disorders • Geriatric considerations • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems

III	8 (T)	• Describe the etiology, psycho-pathology, clinical manifestations, diagnostic criteria and management of childhood and adolescent disorders including mental deficiency	**Nursing Management of Behavioral & Emotional Disorders occurring during Childhood and Adolescence** • **(**Intellectual disability, autism, attention deficit, hyperactive disorder, eating disorders, learning disorder) • Prevalence and incidence • Classifications • Etiology, psychodynamics, Characteristics, diagnostic criteria/formulations • Nursing Assessment: History, Physical, mental status examination and IQ assessment • Treatment modalities and nursing management of childhood disorders including intellectual disability • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
IV	5 (T)	• Describe the etiology, psycho-pathology, clinical manifestations, diagnostic criteria and management of organic brain disorders.	**Nursing Management of Organic Brain Disorders** • (Delirium, Dementia, amnestic disorders) • Prevalence and incidence • Classification • Etiology, psychopathology, clinical features, diagnosis and Differential diagnosis • Nursing Assessment: History, Physical, mental and neurological assessment • Treatment modalities and nursing management of organic brain disorders • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
V	6 (T)	• Identify psychiatric emergencies and carry out crisis intervention	**Psychiatric Emergencies and Crisis Intervention** • Types of psychiatric emergencies (attempted suicide, violence/ aggression, stupor, delirium tremens and other psychiatric emergencies) and their managements • Maladaptive behaviour of individual and groups, stress, crisis and disaster(s) • Types of crisis • Crisis intervention: Principles, Techniques and Process • Stress reduction interventions as per stress adaptation model • Coping enhancement • Techniques of counseling	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Short answer • Objective type

VI	4 (T)	• Explain legal aspects applied in mental health settings and role of the nurse	**Legal Issues in Mental Health Nursing** • Overview of Indian Lunacy Act and The Mental Health Act 1987 • (Protection of Children from Sexual Offence) POSCO Act • Mental Health Care Act (MHCA) 2017 • Rights of mentally ill clients • Forensic psychiatry and nursing • Acts related to narcotic and psychotropic substances and illegal drug trafficking • Admission and discharge procedures as per MHCA 2017 • Role and responsibilities of nurses in implementing MHCA 2017	• Lecture cum discussion • Case discussion	• Short answer • Objective type
VII	5 (T)	• Describe the model of preventive psychiatry • Describe Community Mental health services and role of the nurse	**Community Mental Health Nursing** • Development of Community Mental Health Services: • National mental health policy viz. National Health Policy • National Mental Health Program • Institutionalization versus Deinstitutionalization • Model of Preventive psychiatry • Mental Health Services available at the primary, secondary, tertiary levels including rehabilitation and nurses 'responsibilities • Mental Health Agencies: Government and voluntary, National and International • Mental health nursing issues for special populations: Children, Adolescence, Women Elderly, Victims of violence and abuse, Handicapped, HIV/AIDS etc.	• Lecture cum discussion • Clinical/ field practice • Field visits to mental health service agencies	• Short answer • Objective type • Assessment of the field visit reports

CLINICAL PRACTICUM – 2 Credits (80 hours)

Clinical Practicum for Mental Health Nursing - I & II are given under Mental Health Nursing - I Clinical Practicum

NURSING MANAGEMENT AND LEADERSHIP

PLACEMENT: VI Semester

THEORY: 3 Credits (60 hours) includes Lab/Skill Lab hours also

PRACTICUM: Clinical: 1 Credits (80 hours)

COURSE CODE:

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge and competencies in areas of administration, and management of nursing services and education. Further prepares the students to develop leadership competencies and perform their role as effective leaders in an organization.

COMPETENCIES: On completion of the course, the students will be able to

1. Analyze the health care trends influencing development of nursing services and education in India.
2. Describe the principles, functions and process of management applied to nursing.
3. Develop basic understanding and beginning competencies in planning and organizing nursing services in a hospital.
4. Apply the concept of human resource management and identify the job description for all categories of nursing personnel including in service education.
5. Discuss the principles and methods of staffing and scheduling in an individual hospital/nursing unit.
6. Develop skill in management of materials and supplies including inventory control.
7. Develop team working and inter professional collaboration competencies.
8. Identify effective leadership styles and develop leadership competencies.
9. Utilize the knowledge of principles and line of control and participate in quality management and evaluation activities.
10. Utilize the knowledge related to financial planning in nursing services and education during budgetary process.
11. Apply the knowledge of nursing informatics in maintenance of records and reports relevant to patient information, nursing care and progress.
12. Demonstrate understanding of the INC guidelines for establishment and accreditation of educational institutions in terms of faculty norms, physical infrastructure and clinical facilities.
13. Demonstrate beginning competencies in planning, organizing and staffing at college including implementation and evaluation of curriculum.
14. Identify the legal issues and laws relevant to nursing practice and education.

15 Apply the knowledge and utilize the various opportunities for professional advancement.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	1 (T)	Explore the health care, development of nursing services and education in India and trends	**Health Care and Development of Nursing Services in India** • Current health care delivery system of India – review • Planning and development of nursing services and education at global and national scenario • Recent trends and issues of nursing service and management	• Lecture cum discussion • Directed reading and written assignment	• Short answer • Assessment of assignment
II	2 (T)	Explain the principles and functions of management applied to nursing Describe the introductory concepts of management as a process	**Management Basics Applied to Nursing** • Definitions, concepts and theories of management • Importance, features and levels of management • Management and administration • Functions of management • Principles of management • Role of a nurse as a manager • **Introduction to Management Process** • Planning • Organizing • Staffing • Directing/Leading • Controlling	• Lecture and discussion	• MCQ • Short answer
			MANAGEMENT OF NURSING SERVICES		
III	4 (T)	Describe the essential elements of planning	**Planning Nursing Services** • Vision, Mission, philosophy, objectives • Nursing service policies, procedures and manuals • Functional and operational planning • Strategic planning • Program planning – Gantt chart & milestone chart • Budgeting – concepts, principles, types, • Budget proposal, cost benefit analysis • Planning hospital and patient care unit (Ward) • Planning for emergency and disaster	• Lecture and Discussion • Visit to specific hospital/ patient care units • Demonstration of disaster drill in the respective setting	• Formulate Mission & Vision Statement for the nursing department/ unit • Assessment

IV	4 (T)	Discuss the concepts of organizing including hospital organization	**Organizing** • Organizing as a process – assignment, delegation and coordination • Hospital – types, functions & organization • Organizational development • Organizational structure • Organizational charts • Organizational effectiveness • Hospital administration, Control & line of authority • Hospital statistics including hospital utilization indices • Nursing care delivery systems and trends	• Lecture cum discussion • Comparison of organizational structure of various organizations • Nursing care delivery systems – assignment • Preparation of Organizational chart of hospital/ Nursing services	• Short answer • Assessment of assignment
V	6 (T)	Identify the significance of human resource management (HRM) and material management and discuss its elements	**Staffing (Human resource management)** Definition, objectives, components and functions **Staffing & Scheduling** Staffing – Philosophy, staffing activities Recruiting, selecting, deployment Training, development, credentialing, retaining, promoting, transfer, terminating, superannuation Staffing units – Projecting staffing requirements/calculation of requirements of staff resources Nurse patient ratio, Nurse Population ratio as per SIU norms/IPH Norms, and Patient classification system Categories of nursing personnel including job description of all levels Assignment and nursing care responsibilities Turnover and absenteeism Staff welfare Discipline and grievances	• Lecture and discussion • Role play • Games self-assessment, case discussion and practice session • Calculation of staffing requirements for a specified ward	• Formulate Job description at different levels of care & compare with existing system • Preparation of duty roster

		Explain the procedural steps of material management Develop managerial skill in inventory control and actively participate in procurement process	**In-Service Education** • Nature and scope of in-service education program • Principles of adult learning – review • Planning and organizing in-service educational program • Methods, techniques and evaluation • Preparation of report **Material Resource Management** • Procurement, purchasing process, inventory control & role of nurse • Auditing and maintenance in hospital and patient care unit	Visit to inventory store of the institution	• Preparation of MMF/records • Preparation of log book & condemnation documents • Visit Report
VI	5 (T)	Describe the important methods of supervision and guidance	**Directing and Leading** • Definition, principles, elements of directing • Supervision and guidance • Participatory management • Inter-professional collaboration • Management by objectives • Team management • Assignments, rotations • Maintenance of discipline • Leadership in management	• Lecture and discussion • Demonstration of record & report maintenance in specific wards/ departments	• Assignment on Reports & Records maintained in nursing department/ • Preparation of protocols and manuals
VII	4 (T)	Discuss the significance and changing trends of nursing leadership Analyze the different leadership styles and develop leadership competencies	**Leadership** • Definition, concepts, and theories • Leadership principles and competencies • Leadership styles: Situational leadership, Transformational leadership • Methods of leadership development • Mentorship/preceptorship in nursing • Delegation, power & politics, empowerment, mentoring and coaching • Decision making and problem solving • Conflict management and negotiation • Implementing planned change	• Lecture cum discussion • Self-assessment • Report on types of leadership adopted at different levels of health care in the given setting • Problem solving/ Conflict management exercise • Observation of managerial roles at different levels (middle level mangers-ward in charge, ANS)	• Short answer • Essay • Assessment of exercise/report

VIII	4 (T)	Explain the process of controlling and its activities	**Controlling** • Implementing standards, policies, procedures, protocols and practices • Nursing performance audit, patient satisfaction • Nursing rounds, Documentation – records and reports • Total quality management – Quality assurance, Quality and safety • Performance appraisal • Program evaluation review technique (PERT) • Bench marking, Activity plan (Gantt chart) • Critical path analysis	• Lecture cum discussion • Preparation of policies/ protocols for nursing units/ department	• Assessment of prepared protocols
IX	4 (T)	Explain the concepts of organizational behavior and group dynamics	**Organizational Behavior and Human Relations** • Concepts and theories of organizational behavior • Group dynamics • Review – Interpersonal relationship • Human relations • Public relations in the context of nursing • Relations with professional associations and employee unions • Collective bargaining • Review – Motivation and morale building • Communication in the workplace – assertive communication • Committees – importance in the organization, functioning	• Lecture and discussion • Role play/ exercise – Group dynamics & human relations	• Short answer • OSCE

X	2 (T)	Describe the financial management related to nursing services	**Financial Management** • Definition, objectives, elements, functions, principles & scope of financial management • Financial planning (budgeting for nursing department) • Proposal, projecting requirement for staff, equipment and supplies for – Hospital & patient care units & emergency and disaster units Budget and Budgetary process Financial audit	• Lecture cum discussion • Budget proposal review • Preparation of budget proposal for a specific department	• Short answer • Essay • Assessment of assignment
XI	1 (T)	Review the concepts, principles and methods and use of nursing informatics	**Nursing Informatics/ Information Management – Review** • Patient records • Nursing records • Use of computers in hospital, college and community • Telemedicine & Tele nursing • Electronic Medical Records (EMR), EHR	• Review • Practice session • Visit to departments	• Short answer
XII	1 (T)	Review personal management in terms of management of emotions, stress and resilience	**Personal Management – Review** • Emotional intelligence • Resilience building • Stress and time management – de- stressing • Career planning	• Review • Discussion	
XIII	4 (T)	Describe the process of establishing educational institutions and its accreditation guidelines	**Establishment of Nursing Educational Institutions** • Indian Nursing Council norms and guidelines – Faculty norms, physical facilities, clinical facilities, curriculum implementation, and evaluation/examination guidelines • Coordination with regulatory bodies – INC and State Nursing Council • Accreditation – Inspections • Affiliation with university/State council/board of examinations	• Lecture and discussion • Visit to one of the regulatory bodies	• Visit report

XIV	4 (T)	Explain the planning and organizing functions of a nursing college	**Planning and Organizing** • Philosophy, objectives and mission of the college • Organization structure of school/college • Review – Curriculum planning • Planning teaching and learning experiences, clinical facilities – master plan, time table and clinical rotation • Budget planning – faculty, staff, equipment & supplies, AV aids, Lab equipment, library books, journals, computers and maintenance • Infrastructure facilities – college, classrooms, hostel, library, labs, computer lab, transport facilities • Records & reports for students, staff, faculty and administrative • Committees and functioning • Clinical experiences	• Directed reading – INC Curriculum • Preparation of organizational structure of the college • Written assignment – writing philosophy of a teaching department • Preparation of master plan, time table and clinical rotation	• Short answer • Essay • Assessment of assignment
XV	4 (T)	Develop understanding of staffing the college and selecting the students	**Staffing and Student Selection** Faculty/staff selection, recruitment and placement, job description Performance appraisal Faculty development Faculty/staff welfare Student recruitment, admission, clinical placement	Guided reading on faculty norms Faculty welfare activities report Writing job description of tutors	Short answer Activity report Assessment of job description
XVI	4 (T)	Analyze the leadership and management activities in an educational organization	**Directing and Controlling** • Review – Curriculum implementation and evaluation • Leadership and motivation, supervision – review • Guidance and counseling • Quality management – educational audit • Program evaluation, evaluation of performance • Maintaining discipline • Institutional records and reports – administrative, faculty, staff and students	• Review principles of evaluation • **Assignment –** Identify disciplinary problems among students • Writing student record	• Short answer • Assessment of assignment and record

XVII	4 (T)	Identify various legal issues and laws relevant to nursing practice	**PROFESSIONAL CONSIDERATIONS** • Review – Legal and Ethical Issues • Nursing as a profession – Characteristics of a professional nurse • Nursing practice – philosophy, aim and objectives • Regulatory bodies – INC and SNC constitution and functions • Review – Professional ethics • Code of ethics and professional conduct – INC & ICN • Practice standards for nursing – INC • International Council for Nurses (ICN) • Legal aspects in nursing: • Consumer protection act, patient rights • Legal terms related to practice, legal • system – types of law, tort law & liabilities • Laws related to nursing practice – negligence, malpractice, breach, penalties • Invasion of privacy, defamation of character • Nursing regulatory mechanisms – registration, licensure, renewal, accreditation, nurse practice act, regulation for nurse practitioner/specialist nursing practice		
XVIII	2 (T)	Explain various opportunities for professional advancement	**Professional Advancement** • Continuing Nursing Education • Career opportunities • Membership with professional organizations – national and international • Participation in research activities • Publications – journals, newspaper	• Prepare journal list available in India • Write an article – research/ clinical	• Assessment of assignments

Note: Less than 1 credit lab hours are not specified.

CLINICAL PRACTICUM

Clinical: 2 Credits (80 hours) 2 weeks × 40 hours per week = 80 hours

Practice

Competencies:

Hospital

1. Prepare organizational chart of hospital/Nursing services/nursing department
2. Calculate staffing requirements for a particular nursing unit/ward
3. Formulate Job description at different levels of care
4. Prepare duty roster for staff/students at different levels
5. Participate in procuring/purchase of equipment & supplies
6. Prepare log book/MMF for specific equipment/materials
7. Maintain and store inventory and keep daily records
8. Prepare and maintain various records & reports of the settings – incident reports/adverse reports/audit reports
9. Prepare and implement protocols & manuals
10. Participate in supervision, evaluation and conducting in service education for the staff

College & Hostel

1. Prepare organizational chart of college
2. Formulate job description for tutors
3. Prepare Master plan, time table and clinical rotation
4. Prepare student anecdotes
5. Participate in planning, conducting and evaluation of clinical teaching
6. Participate in evaluation of students 'clinical experience
7. Participate in planning and conducting practical examination OSCE – end of posting

CLINICAL POSTING: Management experience in hospital & college

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - I

including SBA module

PLACEMENT: VI SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Skill Lab**:** 1 Credit (40 hours); Clinical: 3 Credits (240 hours)

COURSE CODE: N-MIDW(I)/OBGN 335

COURSE DESCRIPTION: This course is designed for students to develop knowledge and competencies on the concepts and principles of midwifery. It helps them to acquire knowledge and skills in rendering respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings. It further helps to develop skills in managing normal neonates and participate in family welfare programs.

COMPETENCIES: On completion of the program, the students will be able to

1. Demonstrate professional accountability for the delivery of nursing care as per INC standards/ICM competencies that are consistent with moral, altruistic, legal, ethical, regulatory and humanistic principles in midwifery practice.
2. Communicate effectively with individuals, families and professional colleagues fostering mutual respect and shared decision making to enhance health outcomes.
3. Recognize the trends and issues in midwifery and obstetrical nursing.
4. Review and describe the anatomy and physiology of human reproductive system and conception.
5. Describe and apply physiology in the management of normal pregnancy, birth and puerperium.
6. Demonstrate competency in providing respectful and evidence based maternity care for women during the antenatal, intranatal and postnatal period.
7. Uphold the fundamental human rights of individuals when providing midwifery care.
8. Promote physiologic labour and birth, and conduct normal childbirth.
9. Provide evidence based essential newborn care.
10. Apply nursing process approach in caring for women and their families.
11. Describe the methods of contraception and role of nurse/midwife in family welfare services.
12. Recognize the importance of and actively participate in family welfare programs.
13. Provide youth friendly health services and care for women affected by gender-based violence.

COURSE OUTLINE

T – Theory, SL/L – Skill Lab/Lab, C – Clinical

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	8 (T)	• Explain the history and current scenario of midwifery in India • Review vital health indicators • Describe the various national health programs related to RMNCH+A • Identify the trends and issues in midwifery • Discuss the legal and ethical issues relevant to midwifery practice	**Introduction to midwifery** • History of midwifery in India • *Current scenario:* • Trends of maternity care in India • Midwifery in India – Transformative education for relationship based and transformative midwifery practice in India • Vital health indicators – Maternal mortality ratio, Infant Mortality Rate, Neonatal Mortality Rate, perinatal mortality rate, fertility rates • o Maternal death audit • National health programs related to RMNCH+A (Reproductive Maternal Newborn and Child Health + Adolescent Health) • Current trends in midwifery and OBG nursing: • Respectful maternity and newborn care (RMNC) • Midwifery-led care units (MLCU) • Women centered care, physiologic birthing and de-medicalization of birth • Birthing centers, water birth, lotus birth • Essential competencies for midwifery practice (ICM) • Universal rights of child-bearing women • Sexual and reproductive health and rights • Women‘s expectations & choices about care • Legal provisions in midwifery practice in India: • INC/MOH&FW regulations • ICM code of ethics • Ethical issues in maternal and neonatal care • Adoption laws, MTP act, Pre- Natal Diagnostic Test (PNDT) Act, Surrogate mothers • Roles and responsibilities of a midwife/Nurse practitioner midwife in different settings (hospital/ community) • Scope of practice for midwives	• Discussion • Demonstration • Role play • Directed reading and assignment: ICM competencies • Scenario based learning	• Short answer • Objective type • Essay • Quiz

II	6 (T) 3 (L)	• Review the • anatomy and physiology of human reproductive system	**Anatomy and physiology of human reproductive system and conception (Maternal, Fetal & Newborn physiology)** • *Review:* • Female organs of reproduction • Female pelvis – bones, joints, ligaments, planes, diameters, landmarks, inclination, pelvic variations • Foetal skull – bones, sutures, fontanelles, diameters, moulding • Fetopelvic relationship • Physiology of menstrual cycle, menstrual hygiene • Fertilization, conception and implantation • Embryological development • Placental development and function, placental barrier • Fetal growth and development • Fetal circulation & nutrition	• Lecture • Discussion • Self-directed learning • Models • Videos & films	• Quiz • Short answer • Essay
III	12 (T) 10 (L) 40 (C)	Provide preconception care to eligible couples •	**Assessment and management of normal pregnancy (ante-natal):** • Pre-pregnancy Care • Review of sexual development *(Self Learning)* • Socio-cultural aspects of human sexuality *(Self Learning)* • Preconception care • Pre-conception counseling (including awareness regarding normal birth) Genetic counseling *(Self Learning)* • Planned parenthood **Pregnancy assessment and antenatal care (I, II & III Trimesters)** • Normal pregnancy • Physiological changes during pregnancy • Assess and confirm pregnancy: Diagnosis of pregnancy –Signs, differential diagnosis and confirmatory tests • Review of maternal nutrition & malnutrition • Building partnership with women following RMC protocol • Fathers'engagement in maternity care	• Lecture • Discussion • Demonstration • Self-Learning • Health talk • Role play • Counseling session •	• Short answer • Objective type • Assessment of skills with check list • Case study evaluation • OSCE

		• Describe the physiology, assessment and management of normal pregnancy • Demonstrate knowledge, attitude and skills of midwifery practice throughout 1st,2nd and 3rd trimesters	**Ante-natal care: 1st Trimesters** • Antenatal assessment: History taking, physical examination, breast examination, laboratory investigation • Identification and management of minor discomforts of pregnancy • Antenatal care : as per GoI guidelines • Antenatal counseling (lifestyle changes, nutrition, shared decision making, risky behavior, sexual life during pregnancy, immunization etc.) • Danger signs during pregnancy • Respectful care and compassionate communication • Recording and reporting: as per the GoI guidelines • Role of Doula/ASHAs **II Trimester** • Antenatal assessment: abdominal palpation, fetal assessment, auscultate fetal heart rate – Doppler and pinnard's stethoscope • Assessment of fetal well-being: DFMC, biophysical profile, Non stress test, cardio-tocography, USG, Vibro acoustic stimulation, biochemical tests. • Antenatal care • Women centered care • Respectful care and compassionate communication • Health education on IFA, calcium and vitamin D supplementation, glucose tolerance test, etc. • Education and management of physiological changes and discomforts of 2nd trimester • Rh negative and prophylactic anti D • Referral and collaboration, empowerment • Ongoing risk assessment • Maternal Mental Health	• Case discussion/ presentation • Simulation • Supervised clinical practice • Refer SBA module • & Safe motherhood booklet	

			III Trimester • Antenatal assessment: abdominal palpation, fetal assessment, auscultate fetal heart rate – Doppler and pinnard's stethoscope • Education and management of physiological changes and discomforts of 3rd trimester • Third trimester tests and screening • Fetal engagement in late pregnancy • Childbirth preparation classes • Birth preparedness and complication readiness including micro birth planning • Danger signs of pregnancy – recognition of ruptured membranes • Education on alternative birthing positions – women's preferred choices, birth companion • Ongoing risk assessment • Cultural needs • Women centered care • Respectful and compassionate communication • Health education on exclusive breastfeeding • Role of Doula/ASHA's	• Lab tests – performance and interpretation • Demonstration • Roleplay • Demonstration of antenatal assessment Scenario based learning • Lecture • Simulation • Role play • Refer GoI Guidelines • Health talk • Counseling session • Demonstration of birthing positions • Workshop on alternative birthing positions	
IV	12 (T) 12 (L) 80 (C)	Apply the physiology of labour in promoting normal childbirth Describe the management and care during labour	**Physiology, management and care during labour** • Normal labour and birth • Onset of birth/labour • Per vaginal examination (if necessary) • Stages of labour • Organization of labour room – Triage, preparation for birth • Positive birth environment • Respectful care and communication • Drugs used in labour as per GoI guidelines	• Lecture • Discussion • Demonstration • Bedside clinics • Case discussion/ presentation • Simulated practice • Supervised Clinical practice – Per vaginal examination, Conduction of normal childbirth	• Essay type • Short answer • Objective type • Case study evaluation • Assessment of skills with check list OSCE

		Discuss how to maintain a safe environment for labour Work effectively for pain management during labour Discuss how the midwife provides care and support for the women during birth to enhance physiological birthing and promote normal birth Assess and provide care of the newborn immediately following birth Discuss the impact of labour and birth as a transitional event in the woman's life	**Fist Stage** • Physiology of normal labour • Monitoring progress of labour using Partograph/labour care guide • Assessing and monitoring fetal well being • Evidence based care during 1st stage of labour • Pain management in labour (non-pharmacological) • Psychological support – Managing fear • Activity and ambulation during first stage of labour • Nutrition during labour • Promote positive childbirth experience for women • Birth companion • Role of Doula/ASHA's • **Second stage** • Physiology (Mechanism of labour) • Signs of imminent labour • Intrapartum monitoring • Birth position of choice • Vaginal examination • Psychological support • Non-directive coaching • Evidence based management of physiological birth/Conduction of normal childbirth • Essential newborn care (ENBC) • Immediate assessment and care of the newborn • Role of Doula/ASHA's • **Third Stage** • Physiology – placental separation and expulsion, hemostasis • Physiological management of third stage of labour • Active management of third stage of labour (recommended) • Examination of placenta, membranes and vessels • Assess perineal, vaginal tear/ injuries and suture if required • Insertion of postpartum IUCD • Immediate perineal care • Initiation of breast feeding • Skin to skin contact • Newborn resuscitation **Fourth Stage** • Observation, Critical Analysis and Management of mother and newborn • Maternal assessment, observation fundal height, uterine consistency, urine output, blood loss • Documentation and Record of birth	• Refer SBA module • LaQshya guidelines • Dakshata guidelines • Refer ENBC, NSSK module • Demonstration • Group work • Scenario based learning • Simulation • Role play • Demonstration Videos	

		Ensure initiation of breast feeding and adequate latching	• Breastfeeding and latching • Managing uterine cramp • Alternative/complementary therapies • Role of Doula/ASHA's • Various childbirth practices • Safe environment for mother and newborn to promote bonding • Maintaining records and reports		
V	7 (T) 6 (L) 40 (C)	Describe the physiology, management and care of normal puerperium	**Postpartum care/Ongoing care of women** • Normal puerperium – Physiology, duration • Post-natal assessment and care – facility and home-based care • Perineal hygiene and care • Bladder and bowel function • Minor disorders of puerperium and its management • Physiology of lactation and lactation management • Postnatal counseling and psychological support • Normal postnatal baby blues and recognition of post-natal depression • Transition to parenthood • Care for the woman up to 6 weeks after childbirth • Cultural competence (Taboos related to postnatal diet and practices) • Diet during lactation-review • Post-partum family planning • Follow-up of postnatal mothers • Drugs used in the postnatal period • Records and reports	• Lecture • Discussion • Demonstration • Health talk • Simulated practice • Supervised clinical practice • Refer SBA module	• Essay type • Short answer • Objective type • Assessment of skills with checklist • OSCE
VI	7 (T) 7 (L) 40 (C)	Discuss the need for and provision of compassionate, family centered midwifery care of the newborn Describe the assessment and care of normal neonate	**Assessment and ongoing care of normal neonates** • Family centered care • Respectful newborn care and communication • Normal Neonate – Physiological adaptation • Newborn assessment – Screening for congenital anomalies • Care of newborn up to 6 weeks after the childbirth (Routine care of newborn) Skin to skin contact and thermoregulation • Infection prevention • Immunization • Minor disorders of newborn and its management	• Lecture • Discussion • Demonstration • Simulated practice session • Supervised clinical practice • Refer safe deliver app module – newborn management • Partial completion of SBA module	• Essay type • Short answer • Objective type • Assessment of skills with checklist • OSCE

VII	8 (T) 2 (L) 40 (C)	Explain various methods of family planning and role of nurse/midwife in providing family planning services	**Family welfare services** • Impact of early/frequent childbearing • Comprehensive range of family planning methods o Temporary methods – Hormonal, non-hormonal and barrier methods o Permanent methods – Male sterilization and female sterilization • Action, effectiveness, advantages, disadvantages, myths, misconception and medical eligibility criteria (MEC) for use of various family planning methods • Emergency contraceptives • Recent trends and research in contraception • Family planning counseling using Balanced Counseling Strategy (BCS) • Legal and rights aspects of FP • Human rights aspects of FP adolescents • Youth friendly services – SRHR services, policies affecting SRHR and attitude of nurses and midwives in provision of services (Review) • Importance of follow up and recommended timing	• Lecture • Supervised practice • Field visits • Scenario based learning • Discussion • GoI guidelines – injectable contraceptives, oral contraceptives, IUCD, male and female sterilization	• Essay type • Short answers • Objective type • Field visit reports • Vignettes
		Describe youth friendly services and role of nurses/ midwives Recognize the role of nurses/midwives in gender based violence	**Gender related issues in SRH** • Gender based violence – Physical, sexual and abuse, Laws affecting GBV and role of nurse/midwife • Special courts for abused people • Gender sensitive health services including family planning		

PRACTICUM

PLACEMENT: VI & VII SEMESTER

VI SEMESTER: MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - I

SKILL LAB & CLINICAL: Skill Lab – 1 Credit (40 hours); Clinical – 3 Credits (240 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Counsel women and their families on pre-conception care
2. Demonstrate lab tests ex. urine pregnancy test
3. Perform antenatal assessment of pregnant women
4. Assess and care for normal antenatal mothers
5. Assist and perform specific investigations for antenatal mothers
6. Counsel mothers and their families on antenatal care and preparation for parenthood
7. Conduct childbirth education classes
8. Organize labour room
9. Prepare and provide respectful maternity care for mothers in labour
10. Perform per-vaginal examination for a woman in labour if indicated
11. Conduct normal childbirth with essential newborn care
12. Demonstrate skills in resuscitating the newborn
13. Assist women in the transition to motherhood
14. Perform postnatal and newborn assessment
15. Provide care for postnatal mothers and their newborn
16. Counsel mothers on postnatal and newborn care
17. Perform PPIUCD insertion and removal
18. Counsel women on family planning and participate in family welfare services
19. Provide youth friendly health services
20. Identify, assess, care and refer women affected with gender-based violence

SKILL LAB: Procedures/Skills for demonstration and return demonstration:

1. Urine pregnancy test
2. Calculation of EDD, Obstetrical score, gestational weeks
3. Antenatal assessment
4. Counseling antenatal mothers
5. Micro birth planning
6. PV examination
7. Monitoring during first stage of labour – Plotting and interpretation of partograph
8. Preparation for delivery – setting up labour room, articles, equipment
9. Mechanism of labour – normal
10. Conduction of normal childbirth with essential newborn care
11. Active management of third stage of labour
12. Placental examination
13. Newborn resuscitation
14. Monitoring during fourth stage of labour
15. Postnatal assessment
16. Newborn assessment
17. Kangaroo mother care
18. Family planning counseling
19. PPIUCD insertion and removal

CLINICAL POSTINGS (6 weeks × 40 hours per week = 240 hours)

Clinical Area	Duration (weeks)	Clinical Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
• Antenatal OPD and Antenatal ward	• 1 week	• Perform antenatal assessment • Perform laboratory tests for antenatal women and assist in selected antenatal diagnostic procedures • Counsel antenatal women	• History collection • Physical examination • Obstetric examination • Pregnancy confirmation test • Urine testing • Blood testing for Hemoglobin, grouping & typing • Blood test for malaria • KICK chart • USG/NST • Antenatal counseling • Preparation for childbirth • Birth preparedness and complication readiness	• Antenatal palpation • Health talk • Case study	• OSCE • Case • presentation
• Labour room	• 3 weeks	• Monitor labour using partograph • Provide care to women during labour • Conduct normal childbirth, provide care to mother and immediate care of newborn	• Assessment of woman in labour • Partograph • Per vaginal examination when indicated • Care during first stage of labour • Pain management techniques • Upright and alternative positions in labour • Preparation for labour – articles, physical, psychological • Conduction of normal childbirth • Essential newborn care • Newborn resuscitation • Active management of third stage of labour • Monitoring and care during fourth stage of labour	• Partograph recording • PV examination • Assisting/ Conduction of normal childbirth • Case study • Case • presentation • Episiotomy and suturing if indicated • Newborn resuscitation	• Assignment • case study • Case presentation • OSCE

Post-partum Ward including FP unit	2 weeks	Perform postnatal assessment Provide care to normal postnatal mothers and Newborn Provide postnatal counseling Provide family welfare services	• Postnatal assessment • Care of postnatal mothers – normal • Care of normal newborn • Lactation management • Postnatal counseling • Health teaching on postnatal and newborn care • Family welfare counseling	• Postnatal assessment • Newborn assessment • Case study • Case presentation • PPIUCD insertion & removal	• Assignment • Case study • Case presentation

Note: Partial Completion of SBA module during VI semester

VII SEMESTER

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - II

PRACTICUM

SKILL LAB & CLINICAL: Skill Lab – 1 Credit (40 hours); Clinical – 4 Credits (320 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Identify, stabilize and refer antenatal women with complications
2. Provide care to antenatal women with complications
3. Provide post abortion care& counselling
4. Assist in the conduction of abnormal vaginal deliveries and caesarean section.
5. Demonstrate skills in resuscitating the newborn
6. Assist and manage complications during labour
7. Identify postnatal and neonatal complications, stabilize and refer them
8. Provide care for high risk antenatal, intranatal and postnatal women and their families using nursing process approach
9. Provide care for high risk newborn
10. Assist in advanced clinical procedures in midwifery and obstetric nursing
11. Provide care for women during their non-childbearing period.
12. Assess and care for women with gynecological disorders
13. Demonstrate skills in performing and assisting in specific gynecological procedures
14. Counsel and care for couples with infertility

SKILL LAB: Procedures/Skills for demonstration and return demonstration:

1. Antenatal assessment and identification of complications
2. Post abortion care & counseling
3. Counseling antenatal women for complication readiness
4. Mechanism of labour – abnormal
5. Assisting in the conduction of abnormal vaginal deliveries and caesarean section.
6. Management of complications during pregnancy/labour/post partum (case studies/simulated scenarios)
7. Administration of Inj. Magnesium sulphate
8. Starting and maintaining an oxytocin drip for PPH
9. Management of PPH – Bimanual compression of uterus
10. Management of PPH – Balloon tamponade
11. Instruments used in obstetrics and gynecology
12. Visual inspection of cervix with acetic acid
13. Cervical biopsy
14. Breast examination
15. Counseling of infertile couples

CLINICAL POSTINGS (8 weeks × 40 hours per week = 320 hours)

Clinical Areas	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Antenatal OPD/ infertility clinics/ Reproductive medicine and antenatal ward	2 weeks	Perform/assist in selected advanced antenatal diagnostic procedures Provide antenatal care for women with complications of pregnancy Counsel antenatal mothers Provide post abortion care and postnatal counselling Provide counselling and support to infertile couples	• Kick chart, DFMC • Assist in NST/CTG/USG • Assisting in advanced diagnostic procedures • Care of antenatal women with complications in pregnancy • Antenatal counselling • Preparation for childbirth, Birth preparedness and complication readiness • Post abortion care • Post abortion counselling • Counselling infertile couples	• Antenatal palpation • Health talk • Case study	• Simulation • Case • presentation • OSCE
Labour room	2 weeks	Conduction of normal childbirth Conduct/assist in abnormal deliveries Monitor labour using partograph Identify and manage complications during labour	• Assessment of woman in labour • Partograph • Per-vaginal examination if indicated • Obstetric examination • Care during first stage of labour • Pain management techniques • Upright and alternative positions in labour • Preparation for labour – • articles, physical, psychological • Conduction of normal childbirth • Essential newborn care • Newborn resuscitation • Active management of third stage of labour • Monitoring and care during fourth stage of labour • Identification, stabilization, referral and assisting in management of prolonged labour, cervical dystocia, CPD, contracted pelvis	• Partograph recording • Pain • management during labour • Conduction of normal childbirth • Assisting in abnormal deliveries • Managing complication during labour • Case study • Case • presentation	• Assignment • Case study • Case • presentation • Simulation • OSCE

			• Assist in the management of abnormal deliveries – posterior position, breech deliveries, twin deliveries, vacuum extraction, forceps delivery, shoulder dystocia • Assist in cervical encerclage procedures, D&C, D&E • Identify, assist and manage trauma to the birth canal, retained placenta, post partum hemorrhage, uterine atony • Management of obstetric shock		
Postnatal Ward	1 week	Perform postnatal assessment and identify postnatal complications Provide postnatal care Provide family welfare services	• Postnatal history collection and physical examination • Identify postnatal complications • Care of postnatal mothers – abnormal deliveries, caesarean section • Care of normal newborn • Lactation management • Postnatal counselling • Health teaching on postnatal and newborn care • Family welfare counselling	• Health talk • Postnatal assessment • Newborn assessment • Case studies • Case • presentation • PPIUCD insertion and removal	• Role play • Assignment • Case study • Case • presentation • Simulation • Vignettes • OSCE
Neonatal Intensive Care Unit	1week	Perform assessment of newborn and identify complications/congenital anomalies Perform neonatal resuscitation Care of high risk newborn Provide care for newborns in ventilator, incubator etc Assist/perform special neonatal procedures	• Neonatal assessment – identification of complication, congenital anomalies. • Observation of newborn • Neonatal resuscitation • Phototherapy and management of jaundice in newborn • Assist in Exchange transfusion • Neonatal feeding – spoon and katori, paladai, NG tube • Care of baby in incubator, ventilator, warmer • Infection control in the nursery • Neonatal medications • Starting IV line for newborn, drug calculation	• Case study • Case • presentation • Assignments • Simulated practice	• Case • presentation • Care study • Care plan • Simulation, Vignettes • OSCE

Obstetric/ Gynae operation theatre & Gynecology ward	2weeks	Assist in gynecological and obstetric surgeries Care for women with gynecological disorders	• Observe/Assist in caesarean section • Management of retained placenta • Gynecological surgeries • Hysterectomy • Uterine rupture • Care of women with gynecological conditions • Health education	• Assisting in obstetric and gynecological surgery • Tray set-up for • caesarean section • Care plan	• Assignment • Tray set-up for obstetric and gynecological surgeries • Case • presentation • Simulation • Vignettes

Note: Completion of safe delivery App module during VII Semester

SYLLABUS

VII SEMESTER

B.Sc. NURSING

COMMUNITY HEALTH NURSING – II

PLACEMENT: VII SEMESTER

THEORY: 5 Credits (100 hours) – includes lab hours also

PRACTICUM: Clinical: 2 Credit (160 hours)

COURSE CODE: N-COMH(II) 401

COURSE DESCRIPTION: This course is designed to help students gain broad perspective of specialized roles and responsibilities of community health nurses and to practice in various specialized health care settings. It helps students to develop knowledge and competencies required for assessment, diagnosis, treatment, and nursing management of individuals and families within the community in wellness and illness continuum.

COMPETENCIES: On completion of the course, the students will be able to

1. Demonstrate beginning practice competencies/skills relevant to provide comprehensive primary health care/community- based care to clients with common diseases and disorders including emergency and first aid care at home/clinics/centres as per predetermined protocols/drug standing orders approved by MOH&FW
2. Provide maternal, newborn and child care, and reproductive health including adolescent care in the urban and rural health care settings
3. Describe the methods of collection and interpretation of demographic data
4. Explain population control and its impact on the society and describe the approaches towards limiting family size
5. Describe occupational health hazards, occupational diseases and the role of nurses in occupational health programs
6. Identify health problems of older adults and provide primary care, counseling and supportive health services
7. Participate in screening for mental health problems in the community and providing appropriate referral services
8. Discuss the methods of data collection for HMIS, analysis and interpretation of data
9. Discuss about effective management of health information in community diagnosis and intervention
10. Describe the management system of delivery of community health services in rural and urban area

11. Describe the leadership role in guiding, supervising, and monitoring the health services and the personnel at the PHCs, SCs and community level including financial management and maintenance of records & reports
12. Describe the roles and responsibilities of Mid-Level Health Care Providers (MHCPs) in Health Wellness Centers (HWCs
13. Identify the roles and responsibilities of health team members and explain their job description
14. Demonstrate initiative in preparing themselves and the community for disaster preparedness and management
15. Demonstrate skills in proper bio-medical waste management as per protocols
16. Explain the roles and functions of various national and international health agency

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching / Learning Activities	Assessment Methods
I	10 (T)	Explain nurses' role in identification, primary management and referral of clients with common disorders/ conditions and emergencies including first aid	**Management of common conditions and emergencies including first aid** • Standing orders: Definition, uses • Screening, diagnosing/ identification, primary care and referral of Gastrointestinal System • Abdominal pain • Nausea and vomiting • Diarrhea • Constipation • Jaundice • GI bleeding • Abdominal distension • Dysphagia and dyspepsia oAphthous ulcers Respiratory System • Acute upper respiratory infections – Rhinitis, Sinusitis, Pharyngitis, Laryngitis, • Tonsillitis • Acute lower respiratory infections – Bronchitis, pneumonia and bronchial asthma • Hemoptysis, Acute chest pain • Heart & Blood • Common heart diseases – Heart attack/coronary artery disease, heart failure, arrhythmia • Blood anemia, blood cancers, bleeding disorders • Eye & ENT conditions • Eye – local infections, redness of eye, conjunctivitis, stye, trachoma and refractive errors • ENT – Epistaxis, ASOM, sore throat, deafness • Urinary System • Urinary tract infections – cystitis, pyelonephritis, prostatitis, UTIs in children • First aid in common emergency conditions – Review • High fever, low blood sugar, minor injuries, fractures, fainting, bleeding, shock, stroke, bites, burns, choking, seizures, RTAs, poisoning, drowning and foreign bodies	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice • Assessment of clients with common conditions and provide referral	• Short answer • Essay • Field visit reports • OSCE assessment

II	20 (T)	Provide reproductive, maternal, newborn and childcare, including adolescent care in the urban and rural health care settings	**Reproductive, maternal, newborn, child and adolescent Health (Review from OBG Nursing and application in community setting)** • Present situation of reproductive, maternal and child health in India **Antenatal care** • Objectives, antenatal visits and examination, nutrition during pregnancy, counseling • Calcium and iron supplementation in pregnancy • Antenatal care at health centre level • Birth preparedness • High risk approach – Screening/early identification and primary management of complications – Antepartum hemorrhage, pre-eclampsia, eclampsia, Anemia, Gestational diabetes mellitus, Hypothyroidism, Syphilis • Referral, follow up and maintenance of records and reports **Intra natal care** • Normal labour – process, onset, stages of labour • Monitoring and active management of different stages of labour • Care of women after labour • Early identification, primary management, referral and follow up – preterm labour, fetal distress, prolonged and obstructed labour, vaginal & perennial tears, ruptured uterus • Care of newborn immediately after birth • Maintenance of records and reports • Use of Safe child birth check list • SBA module – Review • Organization of labour room **Postpartum care** • Objectives, Postnatal visits, care of mother and baby, breast feeding, diet during lactation, and health counseling • Early identification, primary management, referral and follow up of complications, Danger signs-postpartum hemorrhage, shock, puerperal sepsis, breast conditions, post-partum depression • Postpartum visit by health care provider	• Lecture • Discussion • Demonstration • Role play • Suggested field visits and field practice • Assessment of antenatal, postnatal, newborn, infant, preschool child, school child, and adolescent health	• Short answer • Essay • OSCE assessment

		Promote adolescent health and youth friendly services	**Newborn and child care** • *Review:* Essential newborn care • Management of common neonatal problems • Management of common child health problems: Pneumonia, Diarrhoea, Sepsis, screening for congenital anomalies and referral • *Review:* IMNCI Module • Under five clinics **Adolescent Health** • Common health problems and risk factors in adolescent girls and boys • Common Gynecological conditions – dysmenoorhea, Premenstrual Syndrome (PMS), Vaginal discharge, Mastitis, Breast lump, pelvic pain, pelvic organ prolapse • Teenage pregnancy, awareness about legal age of marriage, nutritional status of adolescents National Menstrual Hygiene scheme • Youth friendly services: o SRH Service needs o Role and attitude of nurses: Privacy, confidentiality, non judgemental attitude, client autonomy, respectful care and communication • Counseling for parents and teenagers (BCS – balanced counseling strategy) **National Programs** • RMNCH+A Approach – Aims, Health systems strengthening, RMNCH+A strategies, Interventions across life stages, program management, monitoring and evaluation systems • Universal Immunization Program (UIP) as per Government of India guidelines – Review • Rashtriya Bal Swasthya Karyakaram (RSBK) -children • Rashtriya Kishor Swasthya Karyakram (RKSK) – adolscents Any other new programs	• Screen, manage and refer adolescents • Counsel adolescents	

III	4 (T)	Discuss the concepts and scope of demography	**Demography, Surveillance and Interpretation of Data** • *Demography and vital statistics* – demographic cycle, world population trends, vital statistics • Sex ratio and child sex ratio, trends of sex ratio in India, the causes and social implications • *Sources of vital statistics* – Census, registration of vital events, sample registration system • *Morbidity and mortality indicators* – • Definition, calculation and interpretation • Surveillance, Integrated disease surveillance project (IDSP), Organization of IDSP, flow of information and mother and child tracking system (MCTS) in India • Collection, analysis, interpretation, use of data • *Review:* Common sampling techniques – random and nonrandom techniques • Disaggregation of data	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Short answer • Essay
IV	6 (T)	Discuss population explosion and its impact on social and economic development of India Describe the various methods of population control	**Population and its Control** • Population Explosion and its impact on Social, Economic development of individual, society and country. • Population Control – Women Empowerment; Social, Economic and Educational Development • Limiting Family Size – Promotion of small family norm, Temporary Spacing Methods (natural, biological, chemical, mechanical methods etc.), Terminal Methods (Tubectomy, Vasectomy) • Emergency Contraception • Counseling in reproductive, sexual health including problems of adolescents • Medical Termination of pregnancy and MTP Act • National Population Stabilization Fund/JSK (Jansankhya Sthirata Kosh) • Family planning 2020 • National Family Welfare Program • Role of a nurse in Family Welfare Program	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Short answer • Essay • OSCE assessment • Counseling on family planning

V	5 (T)	Describe occupational health hazards, occupational diseases and the role of nurses in occupational health programs	**Occupational Health** • Occupational health hazards • Occupational diseases • ESI Act • National/ State Occupational Health Programs • Role of a nurse in occupational health services – Screening, diagnosing, management and referral of clients with occupational health problems	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Essay • Short answer • Clinical performance evaluation
VI	6 (T)	Identify health problems of older adults and provide primary care, counseling and supportive health services	**Geriatric Health Care** • Health problems of older adults • Management of common geriatric ailments: counseling, supportive treatment of older adults • Organization of geriatric health services • National program for health care of elderly (NPHCE) • State level programs/Schemes for older adults • Role of a community health nurse in geriatric health services – Screening, diagnosing, management and referral of older adults with health problems	• Lecture • Discussion • Demonstration	• Visit report on elderly home • Essay • Short answer
VII	6 (T)	Describe screening for mental health problems in the community, take preventive measures and provide appropriate referral services	**Mental Health Disorders** • Screening, management, prevention and referral for mental health disorders • *Review:* o Depression, anxiety, acute psychosis, Schizophrenia o Dementia o Suicide o Alcohol and substance abuse o Drug deaddiction program o National Mental Health Program o National Mental Health Policy o National Mental Health Act • Role of a community health nurse in screening, initiation of treatment and follow up of mentally ill clients	• Lecture • Discussion • Demonstration • Role play • Health counseling on promotion of mental health • Suggested field visits • Field practice	• Essay • Short answer • Counseling report

VIII	4 (T)	Discuss about effective management of health information in community diagnosis and intervention	**Health Management Information System (HMIS)** • Introduction to health management system: data elements, recording and reporting formats, data quality issues • *Review:* • Basic Demography and vital statistics • Sources of vital statistics • Common sampling techniques, frequency distribution • Collection, analysis, interpretation of data • Analysis of data for community needs assessment and preparation of health action plan	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice • Group project on community diagnosis – data	• Group project report • Essay • Short answer
IX	12 (T)	Describe the system management of delivery of community health services in rural and urban areas	**Management of delivery of community health services:** • Planning, budgeting and material management of CHC, PHC, SC/HWC • **Manpower planning as per IPHS standards** • **Rural:** Organization, staffing and material management of rural health services provided by Government at village, SC/HWC, PHC, CHC, hospitals – district, state and central • **Urban:** Organization, staffing, and functions of urban health services provided by Government at slums, dispensaries, special clinics, municipal and corporate hospitals • Defense services • Institutional services • Other systems of medicine and health: Indian system of medicine, AYUSH clinics, Alternative health care system referral systems, Indigenous health services	• Lecture • Discussion • Visits to various health care delivery systems • Supervised field practice	• Essay • Short answer • Filed visit reports

X	15 (T)	• Describe the leadership role in guiding, supervising, and monitoring the health services and the personnel at the PHCs, SCs and community level including financial management • Describe the roles and responsibilities of Mid-Level Health Care Providers (MHCPs) in Health Wellness Centers (HWCs)	**Leadership, Supervision and Monitoring** • Understanding work responsibilities/job description of DPHN, Health Visitor, PHN, MPHW (Female), Multipurpose health Worker (Male), AWWs and ASHA • Roles and responsibilities of Mid-Level Health Care Providers (MLHPs) • Village Health Sanitation and Nutrition Committees (VHSNC): objectives, composition and roles & responsibilities • Health team management • *Review*: Leadership & supervision – concepts, principles & methods • Leadership in health: leadership approaches in healthcare setting, taking control of health of community and organizing health camps, village clinics • Training, Supportive supervision and monitoring – concepts, principles and process e.g. performance of frontline health workers **Financial Management and Accounting & Computing at Health Centers (SC)** • Activities for which funds are received • Accounting and book keeping requirements o accounting principles & policies, book of accounts to be maintained, basic accounting entries, accounting process, payments & expenditure, fixed asset, SOE reporting format, utilization certificate (UC) reporting • Preparing a budget • Audit **Records & Reports:** • *Concepts of records and reports* – importance, legal implications, purposes, use of records, principles of record writing, filing of records • *Types of records* – community related records, registers, guidelines for maintaining	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Report on interaction with MPHWs, HVs , ASHA, AWWs • Participation in training programs • Essay • Short answer

			• *Electronic Medical Records (EMR)* – capabilities and components of EMR, electronic health record (EHR), levels of automation, attributes, benefits and disadvantages of HER • **Nurses' responsibility in record keeping and reporting**		
XI	6 (T)	Demonstrate initiative in preparing themselves and the community for disaster preparedness and management	**Disaster Management** • Disaster types and magnitude • Disaster preparedness • Emergency preparedness • Common problems during disasters and methods to overcome • Basic disaster supplies kit • Disaster response including emergency relief measures and Life saving techniques • Use disaster management module	• Lecture • Discussion • Demonstration • Role play • Suggested field visits, and field practice • Mock drills • Refer Disaster module (NDMA) National Disaster/INC – Reaching out in emergencies	
XII	3 (T)	Describe the importance of bio- medical waste management, its process and management	**Bio-Medical Waste Management** • Waste collection, segregation, transportation and management in the community • Waste management in health center/clinics • Bio-medical waste management guidelines • – 2016, 2018 (Review)	• Lecture cum Discussion • Field visit to waste management site	• Field visit report
XIII	3 (T)	Explain the roles and functions of various national and international health agencies	**Health Agencies** • **International:** WHO, UNFPA, UNDP, World Bank, FAO, UNICEF, European Commission, Red Cross, USAID, UNESCO, ILO, CAR, CIDA, JHPIEGO, any other • **National:** Indian Red Cross, Indian Council for Child Welfare, Family Planning Association of India, Tuberculosis Association of India, Central Social Welfare Board, All India Women's Conference, Blind Association of India, any other **Voluntary Health Association of India (VHA)**	• Lecture • Discussion Field visits	• Essay • Short answer

COMMUNITY HEALTH NURSING II

Clinical practicum – 2 credits (160 hours) CLINICAL POSTINGS (4 weeks × 40 hours per week)

Clinical Area	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
• Urban • Rural	• 2 weeks • 2 Weeks	• Screen, diagnose, manage and refer clients with common conditions/ emergencies	• Screening, diagnosing, management and referral of clients with common conditions/ emergencies	• Screening, diagnosing, Primary management and care based on standing orders/protocols approved by MOH&FW • Minor ailments – 2 • Emergencies – 1 • Dental problems – 1 • Eye problems – 1	• Clinical performance assessment • OSCE during posting • Final clinical examination (University)
		• Assess and provide antenatal, intrapartum, postnatal and new-born care	• Assessment (physical & nutritional) of antenatal, intrapartum, postnatal and newborn • Conduction of normal delivery at health center • Newborn care	• Ear, nose, and throat problems – 1 • High risk pregnant woman – 1 • High risk neonate – 1 • Assessment of antenatal – 1, intrapartum – 1, postnatal – 1 and newborn – 1 • Conduction of normal delivery at health center and documentation – 2 • Immediate newborn care and documentation – 1	• Clinical performance assessment • OSCE
		• Promote adolescent health	• Counsel adolescents • Family planning counselling	• Adolescent counseling – 1 • Family planning counselling – 1	• Family Case study evaluation
		• Provide family welfare services	• Distribution of temporary contraceptives – condoms, OCP‘s, emergency contraceptives	•	
		• Screen, diagnose, manage and refer clients with occupational health problem	• Screening, diagnosing, management and referral of clients with occupational health problems •	• Family case study – 1 (Rural/Urban) • Screening, diagnosing, management and referral of clients with occupational health problems – 1	• Clinical performance evaluation
		• Screen, assess and manage elderly with health problems and refer appropriately	• Health assessment of elderly	• Screen, assess and manage elderly with health problems and refer appropriately • Health assessment (Physical & nutritional) of elderly – 1	

		Screen, diagnose, manage and refer clients who are mentally unhealthy	Mental health screening	Mental health screening survey – 1	OSCE
		Participate in community diagnosis – data management	Participation in Community diagnosis – data management	**Group project:** Community diagnosis – data management	Project evaluation
		Participate in health centre activities	Writing health center activity report	Write report on health center activities – 1	
		Organize and conduct clinics/health camps in the community	Organizing and conducting clinics/camp	Organizing and conducting Antenatal/under-five clinic/Health camp – 1	
		Prepare for disaster preparedness and management	Participation in disaster mock drills	Participation in disaster mock drills	
		Recognize the importance and observe the biomedical waste management process		Field visit to bio-medical waste management site Visit to AYUSH clinic	

NURSING RESEARCH AND STATISTICS

PLACEMENT: VII SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICUM: Lab/Skill Lab: 1 Credit (40 hours) Clinical Project: 40 hours

COURSE CODE: NRST 405

COURSE DESCRIPTION: The Course is designed to enable students to develop an understanding of basic concepts of research, research process and statistics. It is further, structured to conduct/ participate in need-based research studies in various settings and utilize the research findings to provide quality nursing care. The hours for practical will be utilized for conducting individual/group research project.

COMPETENCIES: On completion of the course, students will be competent to

1. Identify research priority areas
2. Formulate research questions/problem statement/hypotheses
3. Review related literature on selected research problem and prepare annotated bibliography
4. Prepare sample data collection tool
5. Analyze and interpret the given data
6. Practice computing, descriptive statistics and correlation
7. Draw figures and types of graphs on given select data
8. Develop a research proposal
9. Plan and conduct a group/individual research project

COURSE OUTLINE

T – Theory, P – Practicum

Unit	Time (Hrs.)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	6		Describe the concept of research, terms, need and areas of research in nursing Explain the steps of research process State the purposes and steps of Evidence Based Practice	• Research and Research Process • Introduction and need for nursing research • Definition of Research & nursing research • Steps of scientific method • Characteristics of good research • Steps of Research process – overview • Evidence Based Practice – Concept, Meaning, Purposes, Steps of EBP Process and	• Lecture cum Discussion • Narrate steps of research process followed from examples of published studies • Identify research priorities on a given area/ specialty • List examples of Evidence Based Practice	• Short answer • Objective type
II	2	8	Identify and state the research problem and objectives	• Research Problem/Question • Identification of problem area • Problem statement • Criteria of a good research problem • Writing objectives and hypotheses	• Lecture cum Discussion • Exercise on writing statement of problem and objectives	• Short answer • Objective type • Formulation of research questions/ objectives/ hypothesis
III	2	6	Review the related literature	• Review of Literature • Location • Sources • On line search; CINHAL, COCHRANE etc. • Purposes • Method of review	• Lecture cum Discussion • Exercise on reviewing one research report/ article for a selected research problem • Prepare annotated Bibliography	• Short answer • Objective type • Assessment of review of literature on given topic presented
IV	4	1	Describe the Research approaches and designs	• Research Approaches and Designs • Historical, survey and experimental • Qualitative and Quantitative designs	• Lecture cum Discussion • Identify types of research approaches used from examples of published and unpublished research • Studies with rationale	• Short answer • Objective type

V	6	6 40 Hrs (Clinical Project)	Explain the Sampling process Describe the methods of data collection	• Sampling and data Collection • Definition of Population, Sample • Sampling criteria, factors influencing sampling process, types of sampling techniques • Data – why, what, from whom, when and where to collect • Data collection methods and instruments • Methods of data collection • Questioning, interviewing • Observations, record analysis and measurement • Types of instruments, Validity & Reliability of the Instrument • Research ethics • Pilot study • Data collection procedure	• Lecture cum Discussion • Reading assignment on examples of data collection tools • Preparation of sample data collection tool • Conduct group research project	• Short answer • Objective type • Developing questionnaire/ Interview Schedule/ Checklist
VI	4	6	Analyze, Interpret and summarize the research data	**Analysis of data** • Compilation, Tabulation, classification, summarization, presentation, interpretation of data	Lecture cum Discussion Preparation of sample tables	Short answer Objective type Analyze and interpret given data
VII	12	8	Explain the use of statistics, scales of measurement and graphical presentation of data Describe the measures of central tendency and variability and methods of Correlation	**Introduction to Statistics** Definition, use of statistics, scales of measurement.	• Lecture cum Discussion • Practice on graphical presentations • Practice on computation of measures of central tendency, variability • & correlation	• Short answer • Objective type • Computation of descriptive statistics
VIII	4	5	Communicate and utilize the research findings	**Communication and utilization of Research** • Communication of research findings • Verbal report • Writing research report • Writing scientific article/paper • Critical review of published research including publication ethics • Utilization of research findings • Conducting group research project	• Lecture cum Discussion • Read/ Presentations of a sample published/ unpublished research report • Plan, conduct and Write individual/group research project	• Short answer • Objective type • Oral • Presentation • Development of research proposal • Assessment of research Project

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING - II

including Safe Delivery App Module

PLACEMENT: VII SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Skill Lab: 1 Credit (40 Hours) Clinical: 4 Credits (320 Hours)

COURSE CODE: N-MIDW(II)/OBGN 410

COURSE DESCRIPTION: This course is designed for students to develop knowledge and competencies on the concepts and principles of obstetric and gynecology nursing. It helps them to acquire knowledge and skills in rendering respectful maternity care to high risk woman during antenatal, natal and postnatal periods in hospitals and community settings and help to develop skills in initial management and referral of high-risk neonates. It would also help students to gain knowledge, attitude and skills in caring for women with gynecological disorders.

COMPETENCIES: On completion of the course, the students will be able to:

1. Describe the assessment, initial management, referral and respectful maternity care of women with high risk pregnancy.
2. Demonstrate competency in identifying deviation from normal pregnancy.
3. Describe the assessment, initial management, referral and nursing care of women with high risk labour.
4. Assist in the conduction of abnormal vaginal deliveries and caesarean section.
5. Describe the assessment, initial management, referral and nursing care of women with abnormal postnatal conditions.
6. Demonstrate competency in the initial management of complications during the postnatal period.
7. Demonstrate competency in providing care for high risk newborn.
8. Apply nursing process in caring for high risk women and their families.
9. Describe the assessment and management of women with gynecological disorders.
10. Demonstrate skills in performing and assisting in specific gynecological procedures.
11. Describe the drugs used in obstetrics and gynecology.
12. Counsel and care for couples with infertility.
13. Describe artificial reproductive technology.

COURSE OUTLINE

T – Theory, SL/L – Skill Lab, C – Clinical

Unit	Time (Hrs.)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	12 (T) 10 (L) 80 (C)	Describe the assessment, initial management, and referral of women with problems during pregnancy Support women with complicated pregnancy and facilitate safe and positive birthing outcome	**Recognition and Management of problems during Pregnancy** • Assessment of high-risk pregnancy **Problems/Complications of Pregnancy** • Hyper-emesis gravidarum, • Bleeding in early pregnancy – abortion, ectopic pregnancy, vesicular mole • Unintended or mistimed pregnancy • Post abortion care & counseling • Bleeding in late pregnancy placenta previa, abruption placenta, trauma • Medical conditions complicating pregnancy – Anemia, PIH/Pre-eclampsia, Eclampsia, GDM, cardiac disease, pulmonary disease, thyrotoxicosis, STDs, HIV, Rh incompatibility • Infections in pregnancy – urinary tract infection, bacterial, viral, protozoal, fungal, malaria in pregnancy • Surgical conditions complicating pregnancy – appendicitis, acute abdomen • COVID-19 & pregnancy and children • Hydramnios • Multiple pregnancy • Abnormalities of placenta and cord • Intra uterine growth restriction • Intra uterine fetal death • Gynaecological conditions complicating pregnancy • Mental health issues during pregnancy • Adolescent pregnancy • Elderly primi, grand multiparity • Management and care of conditions as per the GoI protocol • Policy for the referral services • Drugs used in management of high-risk pregnancies • Maintenance of records and reports	• Lecture • Discussion • Demonstration • Video & films • Scan reports • Case discussion • Case presentation • Drug presentation • Health talk • Simulation • Role play • Supervised Clinical practice • WHO midwifery toolkit • GoI guideline – screening for hypothyroidism, screening for syphilis, deworming during pregnancy, diagnosis and management of GDM	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE

II	20 (T) 15 (L) 80 (C)	• Identify, provide initial management and refer women with problems during labour within the scope of midwifery practice.	**Recognition and management of abnormal labour** • Preterm labour – Prevention and management of preterm labour; (Use of antenatal corticosteroids in preterm labour) • Premature rupture of membranes • Malposition's and abnormal presentations (posterior position, breech, brow, face, shoulder) • Contracted Pelvis, Cephalo Pelvic Disproportion (CPD) • Disorders of uterine action – Prolonged labour, Precipitate labour, Dysfunctional labour • Complications of third stage – Retained placenta, Injuries to birth canal, Postpartum hemorrhage (bimanual compression of the uterus, aortic compression, uterine balloon tamponade) • Obstetric emergencies – Foetal distress, Ruptured uterus, Cord prolapse, Shoulder dystocia, Uterine inversion, Vasa previa, Obstetrical shock, Amniotic fluid embolism • Episiotomy and suturing • Obstetric procedures – Forceps delivery, Vacuum delivery, Version • Induction of labour – Medical & surgical • Caesarean section – indications and preparation • Nursing management of women undergoing • Obstetric operations and procedures • Drugs used in management of abnormal labour • Anesthesia and analgesia in obstetrics	• Lecture • Discussion • Demonstration • Case discussion/ presentation • Simulation • Role play • Drug presentation • Supervised clinical practice • WHO midwifery toolkit • GoI guidelines – use of uterotonics during labour, antenatal corticosteroids • GoI guidance note on prevention and management of PPH	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE
III	9 (T) 5 (L) 40 (C)	Describe the assessment, initial management, referral and nursing care of women with abnormal postnatal conditions.	**Recognition and Management of postnatal problems** • Physical examination, identification of deviation from normal • Puerperal complications and its management • Puerperal pyrexia • Puerperal sepsis • Urinary complications • Secondary Postpartum hemorrhage • Vulval hematoma • Breast engorgement including mastitis/breast abscess, feeding problem • Thrombophlebitis	• Lecture • Demonstration • Case discussion/ presentation • Drug presentation • Supervised clinical practice	• Quiz • Simulation • Short answer • OSCE

			• DVT • Uterine sub involution • Vesico vaginal fistula (VVF), Recto vaginal fistula (RVF) • Postpartum depression/psychosis • Drugs used in abnormal puerperium • Policy about referral		
IV	7 (T) 5 (L) 40 (C)	Describe high risk neonates and their nursing management	**Assessment and management of High- risk newborn (Review)** • Models of newborn care in India – NBCC; SNCUs • Screening of high-risk newborn • Protocols, levels of neonatal care, infection control • Prematurity, Post-maturity • Low birth weight • Kangaroo Mother Care • Birth asphyxia/Hypoxic encephalopathy • Neonatal sepsis • Hypothermia • Respiratory distress • Jaundice • Neonatal infections • High fever • Convulsions • Neonatal tetanus • Congenital anomalies • Baby of HIV positive mothers • Baby of Rh-negative mothers • Birth injuries • SIDS (Sudden Infant Death Syndrome) prevention, Compassionate care • Calculation of fluid requirements, EBM/formula feeds/tube feeding • Home based newborn care program community facility integration in newborn care • Decision making about management and referral • Bereavement counseling • Drugs used for high risk newborns • Maintenance of records and reports	• Lecture • Discussion • Demonstration • Simulation • Case discussion/ presentation • Drug presentation • Supervised Clinical practice • Integrated Management of Neonatal Childhood Illnesses (IMNCI)	• Short answer • Objective type • Assessment of skills with check list • OSCE

V	12 (T) 5 (L) 80 (C)	Describe the assessment and management of women with gynecological disorders.	**Assessment and management of women with gynecological disorders** • Gynecological assessment – History and Physical assessment • Breast Self-Examination • Congenital abnormalities of female reproductive system • Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and management of women with • Menstrual abnormalities • Abnormal uterine bleed • Pelvic inflammatory disease • Infections of the reproductive tract • Uterine displacement • Endometriosis • Uterine and cervical fibroids and polyps • Tumors – uterine, cervical, ovarian, vaginal, vulval • Cysts – ovarian, vulval • Cystocele, urethrocele, rectocele • Genitor-urinary fistulas • Breast disorders – infections, deformities, cysts, tumors • HPV vaccination • Disorders of Puberty and menopause • Hormonal replacement therapy • Assessment and management of couples with infertility • Infertility – definition, causes • Counseling the infertile couple • Investigations – male and female • Artificial reproductive technology • Surrogacy, sperm and ovum donation, cryopreservation • Adoption – counseling, procedures • Injuries and Trauma; Sexual violence • Drugs used in treatment of gynaecological disorders	• Lecture • Discussion • Demonstration • Case discussion/ presentation • Drug presentation • Videos, films • Simulated practice • Supervised Clinical practice • Visit to infertility clinic and ART centers	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE

Note: Complete safe delivery app during VII Semester.

PRACTICUM

SKILL LAB & CLINICAL ARE GIVEN UNDER OBG NURSING – I

LIST OF APPENDICES

APPENDIX 01

LIST OF MANDATORY MODULES

SL NO.	MODULE
01	FIRST AID MODULE (Nursing Foundation I)
02	HEALTH ASSESSMENT MODULE (Nursing Foundation II)
03	BLS/BCLS MODULE (Adult Health Nursing I)
04	FUNDAMENTALS OF PRESCRIBING MODULE (Pharmacology II)
05	PALLIATIVE CARE MODULE
06	FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) MODULES (Child Health Nursing I)
07	IMNCI MODULE (Child Health Nursing I)
08	PLS MODULE (Child Health Nursing I)
09	SBA MODULE & SAFE DELIVERY APP MODULE (Midwifery/Obstetrics & Gynaecology Nursing I & II)

FIRST AID MODULE (Nursing Foundation I)

PLACEMENT: I SEMESTER

Theory: 20 hours

Practical: 20 hours

Module Overview: This module covers various basic first aid techniques including basic CPR and common emergencies. It further aims to train students to develop first aid competencies to deal with specific emergencies to preserve life.

Competencies (Learning Outcomes): The student will be able to

1. Explain basic principles of first aid and law related to first aid.
2. Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.
3. Identify common emergencies that require immediate attention and first aid.
4. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.
5. Perform first aid measures such as dressings, bandages, and safe transportation.
6. Prepare first aid kit.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Role play
- Mock drill
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type): 20 marks
- Assignments: 10 marks
- OSCE (First aid competencies): 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Explanatory Note:

{Weightage to Internal Assessment: 10 marks taken out of 50 marks mentioned above have to be added to 30 marks of continuous assessment of Nursing Foundation I to make up the total of 40 marks.

Final 40/4 = 10 marks of continuous assessment to be added to 15 marks from sessional exams to make up the total internal assessment marks of 25}.

CONTENT OUTLINE

T-Theory, Practical-P

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	T-2	Explain basic principles of first aid and law related to first aid.	**First Aid:** • Introduction • Aims • First aid and law • **General Principles:** ○ Safety ○ Seeking help ○ Quick assessment • Observation - consciousness and breathing ○ Provision of first aid	• Lecture cum discussion • Role play	• MCQ • Short answers
II	T-5 P-6	Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.	**First aid techniques** • Basic CPR - Adult & baby/ child • Securing open airway • Recovery position • Initial top-to-toe assessment • Hygiene & Handwashing technique	• Lecture cum discussion • Demonstration • Practice in skill lab/Simulation lab	• Short answers • OSCE

III	T-8 P-8	Identify common emergencies that require immediate attention and first aid. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.	**First aid management of Common emergencies** • Review of anatomy & physiology of systems mentioned below. • **Respiratory system:** ○ Drowning ○ Strangulation & hanging ○ Choking ○ Suffocation by smoke ○ Asthma • **CVS** ○ Chest discomfort/pain ○ Bleeding ○ Shock • **Injury & fractures** ○ Head, neck & spinal injuries ○ Injuries & fractures to bones, joints, and muscles ○ Dislocations ○ Strains & Sprains ○ Immobilization techniques • **Unconsciousness & Nervous system related emergencies** ○ Unconsciousness ○ Stroke ○ Convulsions, epilepsy • **GI & Endo system related emergencies** ○ Diarrhea ○ Food poisoning ○ Diabetes • **Skin, burns, heat exhaustion, fever & hypothermia** ○ Burns ○ Heat stroke ○ Fever ○ Hypothermia • **Poisoning** • **Bites & stings** ○ Animal bites, insect stings & bites ○ Snake bites • **Sensory system related** ○ Foreign bodies in eye, ear, nose, or skin	• Self-study, Review & written assignment • Lecture cum discussion • Demonstration • Role play • Practice in skill lab/clinical • Mock drill	• Case study • Written Assignment • OSCE

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
			oSwallowed foreign objects • **Urinary system, reproductive system, and emergency childbirth** • **Psychological first aid** • **Emergency situations and disaster management**		
IV	T-4 P-6	Demonstrate competency in performing first aid measures such as dressings, bandages, and safe transportation	**Selected First Aid Techniques** • Dressing • Bandaging • Transportation	• Demonstration • Practice	• OSCE
V	T-1	Describe first aid kit	**First Aid Kit** • Content of first aid box - small, medium, and large • First medical responder first aid kit	• Display & discussion	• Short answers • Observation Report

Learning Resources: (Latest version to be consulted as and when revised)

- Indian First aid manual by IRCS (Seventh edition, 2016)
- Standard first aid training course outline (IRCS, 2019)
- Subsequent and latest revisions must be consulted and used by teachers and students.
- FAST mobile app prepared by NDMA & IRCS may also be used.

HEALTH ASSESSMENT MODULE (Nursing Foundation II)

PLACEMENT: II SEMESTER

Theory: 20 hours

Practical-Skill Lab: 20 hours

Module Overview: This module covers methods of health assessment, nursing health history, comprehensive physical assessment and guide to perform physical assessment.

Competencies (Learning Outcomes): The student will be able to

1. Identify the purposes of the physical examination.
2. Describe the preparation for health assessment.
3. Explain the four methods/techniques used in physical examination: inspection, palpation, percussion, and auscultation.
4. Perform comprehensive health assessment that includes nursing health history and system wise physical examination.
5. Identify expected findings during health assessment.

Learning Activities:

- Lectures
- Demonstration
- Practice in Skill/Simulation Lab
- Case study method (case scenario and questions)
- Self-study/Reading assignments
- Written assignments

Assessment Methods:

- Test paper - Objective type/Short answers - 20 marks
- Assignments - 10 marks
- OSCE-20 (Nursing Health history, System wise physical assessment, Comprehensive physical assessment and identification of abnormal findings)

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4 P-4	Identify The Purposes of the Physical Examination and Describe the Preparation for Health Assessment. Explain the Four Methods/ Techniques used in Health Assessment:	**Health Assessment** • Definition/Meaning • Purposes • Preparation for Health Assessment • Methods of Health Assessment ○ Inspection, ○ Palpation, ○ Percussion, and ○ Auscultation.	• Lecture • Demonstration • Practice in Skill Lab and Clinical	• MCQ • Short answers • OSCE
II	T-8 P-8	Perform Comprehensive Health Assessment that includes Nursing Health History and System Wise Physical Examination.	**Comprehensive Health Assessment** • Nursing Health History • *Physical Assessment* • Comprehensive Physical Examination - System Wise	• Self-Study Review of Anatomy of System and Organs • Lecture • Demonstration • Practice in Skill Lab and Clinical	• Short answers • Written assignments • OSCE
III	T-8 P-8	Identify Expected Findings during Health Assessment	**Guide To Perform Head-to-Toe Physical Assessment to identify Normal/Abnormal Findings** Assessment Techniques and Normal Findings	• Lecture cum discussion • Demonstration • Practice in Skill Lab And Clinical Identification of Findings	• Short answers • Written assignments OSCE

Learning Resource:

Health Assessment Module prepared by INC, given below.

HEALTH ASSESSMENT MODULE (Nursing Foundation II)

S.No.	Content
1	**INTRODUCTION**
	Purposes of health assessment
	Preparation for health assessment
	Methods of health assessment
2	**A. COMPREHENSIVE HEALTH ASSESSMENT**
	I. Nursing Health History
	II. Physical Assessment
	1. Assessment of mental status, anthropometric measurements and vital signs
	2. Assessment of the integumentary system
	3. Assessment of head and neck
	4. Assessment of breast and axillae
	5. Assessment of respiratory system - thorax & lungs
	6. Assessment of cardiovascular system - Heart
	7. Assessment of abdomen
	8. Assessment of male and female genitalia
	9. Assessment of rectum and anus
	10. Assessment of musculoskeletal system
	11. Assessment of peripheral vascular system
	12. Assessment of neurological system
3	**B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT**
	1. Integumentary system
	2. Head and Neck
	3. Anterior & Posterior thorax (Breast & axillae, thorax, lungs, heart)
	4. Abdomen
	5. Male and female genitalia
	6. Rectum and anus
	7. Extremities (Musculoskeletal system & Peripheral vascular system)
	8. Neurological system
4	Annexure 1: Terminology relevant to Neurological system
5	Annexure 2: Sample Health Assessment Format (Adult)

HEALTH ASSESSMENT

INTRODUCTION

Health assessment is the evaluation of the health status by performing a physical examination after taking a health history. Successful assessment requires a practical understanding of what is involved, the time and resources necessary to undertake assessment, and sufficient integration of findings into planning and implementation of treatment and care.

Purposes of Health Assessment

- To identify the patient's response to health and illness
- To determine the nursing care needs of the patient
- To evaluate outcomes of health care and patient progress
- To screen for presence of risk factors.

Preparation for Health Assessment (infection control, preparation of equipment, environment and patient)

- *Infection control*
  - Use standard precautions as appropriate
  - Use personal protective equipment (gloves, mask, etc.)
  - Perform hand hygiene
- Utilize clean instruments.
- *Preparation of environment*
- Ensure adequate lighting is available
  - Use sound proof room or minimize noise
  - Use special examination tables as needed
  - Provide ideal room temperature
  - Ensure adequate privacy (curtains)
- Provide safety and prevent falls.
- *Preparation of equipment*
- Collect and arrange all equipment for easy access
  - Check functioning of all equipment (change batteries if needed)
  - Warm equipment before use, if required
  - Equipment usually collected are Sphygmomanometer, stethoscope, thermometer, cotton balls, tongue depressor, reflex hammer, swab stick, k-basin, tuning fork, etc.

Preparation of the patient

- *Physical preparation of the patient*
  - Ensure physical comfort
  - Position patient as required
  - Dress and drape patient appropriately
  - Keep patient warm
  - Assist patient to restroom prior to examination and collect samples (urine/stool) if required.
- *Psychological preparation of the patient*
- Explain the procedure and its need to the patient. Clarify doubts to reduce anxiety
  - Maintain a calm, open and professional approach
  - Provide chaperone when the patient is of the opposite gender of the nurse
  - Look for verbal and non-verbal cues to identify patient's discomfort and stop or postpone the examination if needed.

Methods of Physical Assessment

1. *Inspection:* It is the use of vision and hearing to detect normal and abnormal findings. Adequate lighting should be ensured with paying attention to detail. The same area on the opposite side should be compared whenever applicable. Inspection is done to assess moisture, color, and texture of body surface as well as shape, position, size, and symmetry of the body parts.

2. *Palpation:* It is the use of the hands and the sense of touch to gather data. The pads of the fingers are used. Different parts of the hand are best suited for specific purposes. For example, the dorsal aspect of the hand is best for assessing temperature changes. Hand hygiene is to be ensured.

   Types of palpation: Light palpation (<1 cm), Moderate palpation (1-2 cm) & Deep palpation (2 cm) and Bimanual Palpation & palpation with single hand.

   The purpose is to assess the texture, temperature, tenderness, moisture, size, distention, pulsation, and mobility of organs or masses

3. *Percussion:* It means tapping of various body organs and structures to produce vibration and sound. It is the act of striking the body surface to elicit sounds that can be heard or vibration that can be felt.

   Types of percussion: Direct percussion and Indirect (use of plexor & pleximeter) percussion.

   The purpose is to determine the location, size and density of underlying tissue structures and if tissue is fluid filled, air filled or solid.

   Sounds heard: Flatness (muscle or bone), dullness (organs), resonance (lungs filled with air), hyper resonance (emphysematous lung), tympany (air filled stomach).

4. *Auscultation:* The act of listening to sounds within the body to evaluate the condition of body organs (stethoscope) can be performed with unaided ear or stethoscope. Sounds are described according to their
   a. Pitch: The frequency of the vibrations (ranging from high to low)
   b. Intensity: The loudness or softness of a sound
   c. Duration: The sound length (short, medium, or long)
   d. Quality: Subjective description of sounds (gurgling, swishing)

5. *Olfaction:* It is the use of sense of smell to perceive and differentiate odors.

Example: Acetone breath in Diabetic Keto Acidosis

A. COMPREHENSIVE HEALTH ASSESSMENT

A comprehensive health assessment includes:

I. Nursing Health History

- A general survey - Demographic data, Physical environmental history, Biological environmental history
- Health history - Family and Personal health history
- A complete medical history-past and present medical history

II. Physical Assessment

1. General appearance, mental status, anthropometric measurements and vital signs

General appearance and mental status: Physical assessment begins with observation of the patient's general appearance, level of comfort, and mental status.

Anthropometric measurements: Measurement of height, weight and BMI follows next.

Vital signs: The pulse, blood pressure, bodily temperature and respiratory rate are measured and documented.

2. Assessment of the Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

3. Assessment of the Head& Neck (The Face and Skull, Eyes, Ears, Nose, Mouth, Throat, Neck)

3.1 Face and Skull

Inspection: The size, shape and symmetry of the face and skull, facial movements and symmetry are inspected.

Palpation: The presence of any lumps, soreness, and masses are assessed.

3.2 Eyes

Inspection: Pupils in reference to their bilateral equality, reaction to light and accommodation, the presence of any discharge, irritation, redness and abnormal eye movement are assessed.

Standardized Testing: The Snellen chart for visual acuity

3.3 Ears

Inspection: The auricles are inspected in terms of color, symmetry, elasticity and any tenderness or lesions; the external ear canal is inspected for color and the presence of any drainage and ear wax; and the tympanic membrane in terms of color, integrity and the lack of any bulging is also assessed.

Standardized Testing: The Rinne test and the Weber test for the assessment of hearing can be done using a tuning fork.

3.4 Nose

Inspection: The color, size, shape, symmetry, and any presence of drainage, flaring, tenderness, and masses are assessed; the nasal passages are assessed visually using an otoscope of the correct size for an infant, child and adult; the sense of smell is also assessed.

Palpation: The sinuses are assessed for any signs of tenderness and infection.

3.5 Mouth and Throat

Inspection: The lips are visualized for their symmetry and color; the buccal membranes, the gums and the tongue are inspected for color, any lesions and their level of dryness or moisture; the tongue is inspected for symmetry of movement; teeth are inspected for the presence of any loose or missing teeth; the uvula is assessed for movement, position, size and color; the salivary glands are examined for signs of inflammation or redness; the oropharynx, tonsils, hard and soft palates are also inspected for color, redness and any lesions. Lastly, the gag reflex is assessed. The mouth and the throat are assessed using a tongue blade and a light source.

3.6 Neck

Inspection: The neck and head movement is visualized; the thyroid gland is inspected for any swelling and also for normal movement during swallowing.

Palpation: The neck, the lymph nodes, and trachea are palpated for size and any irregularities.

4. Assessment of the Breast and Axillae

Inspection: The breasts are visualized to assess the size, shape, symmetry, color and the presence of any dimpling, lesions, swelling, edema, visible lumps and nipple retractions. The nipples are also assessed for the presence of any discharge, which is not normal for either gender except when the female is pregnant or lactating.

Palpation: The nurse performs a complete breast examination using the finger tips to determine if any lumps are felt. The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

5. Assessment of Respiratory System (Thorax and Lungs)

5.1 Assessment of the Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to assess normal and abnormal sounds over the thorax

5.2 Assessment of the Lungs

Auscultation: The assessment of normal and adventitious breath sounds.

Percussion: It is done to identify for normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

6. Assessment of the Cardiovascular System (Heart)

Inspection: Pulsations indicating the possibility of an aortic aneurysm are identified by inspection.

Auscultation: Listening to systolic heart sounds like the normal S_1 heart sound and abnormal clicks, the diastolic heart sounds of S_2, S_3, S_4, diastolic knocks and mitral valve sounds, all of which are abnormal with the exception of S_2 which can be normal among patients less than 40 years of age.

7. Assessment of the Abdomen

Inspection: The abdomen is visualized to determine its size, contour, symmetry and the presence of any lesions. As previously mentioned, the abdomen is also inspected to determine the presence of any pulsations that could indicate the possible presence of an abdominal aortic aneurysm.

Auscultation: The bowel sounds are assessed in all four quadrants which are the upper right quadrant, the upper left quadrant, the lower right quadrant and the lower left quadrant.

Palpation: Light palpation, which is then followed with deep palpation, is done to assess for the presence of any masses, tenderness, and pain, guarding and rebound tenderness.

8. Assessment of the Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female patients. The penis, urethral meatus, and the scrotum are inspected among male patients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male patients.

9. Assessment of the Rectum and Anus

Inspection: The rectum, anus and the surrounding area are examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

10. Assessment of the Musculoskeletal System

Inspection: The major muscles of the body are inspected by the nurse to determine their size, and strength, and the presence of any tremors, contractures, muscular weakness and/or paralysis. All joints are assessed for their full range of motion. The areas around the bones and the major muscle groups are also inspected to determine any areas of deformity, swelling and/or tenderness.

Palpation: The muscles are palpated to determine the presence of any spasticity, flaccidity, pain, tenderness, and tremors.

11. Assessment of the Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

12. Assessment of the Neurological System

Of all of the bodily systems that are assessed, the neurological system is perhaps the most extensive and complex.

The neurological system is assessed with:

Inspection

Balance, gait, gross motor function, fine motor function and coordination, sensory functioning, temperature sensory functioning, kinesthetic sensations and tactile sensory motor functioning, as well as all of the cranial nerves are assessed.

Some of the terms and terminology relating to the neurological system and neurological system disorders are given in **Annexure 1.**

B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT

1. Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

2. Head & Neck (Skull, Scalp, Hair, Face, Eyes, Ears, Nose, Mouth, Throat, Neck)

- Observe the size, shape and contour of the skull.
- Observe scalp in several areas by separating the hair at various locations; inquire about any injuries. Note presence of lice, nits, dandruff or lesions.
- Palpate the head by running the pads of the fingers over the entire surface of skull; inquire about tenderness upon doing so. (wear gloves if necessary)
- Observe and feel the hair condition.

Normal Findings:

2.1 Skull

- Generally round, with prominences in the frontal and occipital area (Normocephalic).
- No tenderness noted upon palpation.

2.2 Scalp

- Lighter in color than the complexion.
- Can be moist or oily.
- No scars noted.
- Free from lice, nits and dandruff.
- No lesions should be noted.
- No tenderness or masses on palpation.

2.3 Hair

- Can be black, brown or blonde depending on the race.
- Evenly distributed, covers the whole scalp.
- No evidences of Alopecia.
- Maybe thick or thin, coarse or smooth.
- Neither brittle nor dry.

2.4 Face

- Observe the face for shape.
- Inspect for Symmetry.
  - Inspect for the palpebral fissure (distance between the eye lids of each eye); should be equal in both eyes.
  - Ask the patient to smile, There should be bilateral Nasolabial fold (creases extending from the angle of the corner of the mouth). Slight asymmetry in the fold is normal.
  - If both are met, then the Face is symmetrical
- Test the functioning of Cranial Nerves that innervates the facial structures

2.5 Eyes

Eyebrows, Eyes and Eyelashes

- All three structures are assessed using the modality of inspection.

Normal findings

Eyebrows

- Symmetrical and in line with each other.
- Maybe black, brown or blond depending on race.
- Evenly distributed.

Severe exophthalmos

Eyes

- Evenly placed and in line with each other.
- None protruding.
- Equal palpebral fissure.

Eyelashes

- Color dependent on race.
- Evenly distributed.
- Turned outward.

Eyelids and Lacrimal Apparatus

- Inspect the eyelids for position and symmetry.
- Palpate the eyelids for the lacrimal glands.
  - To examine the lacrimal gland, the examiner, lightly slides the pad of the index finger against the client's upper orbital rim.
  - Inquire for any pain or tenderness.
- Palpate for the nasolacrimal duct to check for obstruction.
  - To assess the nasolacrimal duct, the examiner presses with the index finger against the client's lower inner orbital rim, at the lacrimal sac, **NOT AGAINST THE NOSE.**
  - In the presence of blockage, this will cause regurgitation of fluid in the puncta

Normal Findings

Eyelids

- Upper eyelids cover the small portion of the iris, cornea, and sclera when eyes are open.
- No PTOSIS noted. (Drooping of upper eyelids).
- Meets completely when eyes are closed.
- Symmetrical.

Lacrimal Apparatus

- Lacrimal gland is normally non-palpable.
- No tenderness on palpation.
- No regurgitation from the nasolacrimal duct.

Conjunctivae

- The bulbar and palpebral conjunctivae are examined by separating the eyelids widely and having the

client look up, down and to each side. When separating the lids, the examiner should exert NO PRESSURE against the eyeball; rather, the examiner should hold the lids against the ridges of the bony orbit surrounding the eye.

In examining the palpebral conjunctiva, everting the upper eyelid in necessary and is done as follow:

1. Ask the client to look down but keep his eyes slightly open. This relaxes the levator muscles, whereas closing the eyes contracts the orbicularis muscle, preventing lid eversion.
2. Gently grasp the upper eyelashes and pull gently downward. Do not pull the lashes outward or upward; this, too, causes muscles contraction.
3. Place a cotton tip application about 1cm above the lid margin and push gently downward with the applicator while still holding the lashes. This everts the lid.
4. Hold the lashes of the everted lid against the upper ridge of the bony orbit, just beneath the eyebrow, never pushing against the eyeball.
5. Examine the lid for swelling, infection, and presence of foreign objects.
6. To return the lid to its normal position, move the lid slightly forward and ask the client to look up and to blink. The lid returns easily to its normal position.

Normal Findings

- Both conjunctivae are pinkish or red in color.
- With presence of many minute capillaries.
- Moist
- No ulcers
- No foreign objects

Sclerae

- The sclerae is easily inspected during the assessment of the conjunctivae.

Normal Findings

- Sclerae is white in color (anicteric sclera)
- No yellowish discoloration (icteric sclera).
- Some capillaries maybe visible.
- Some people may have pigmented sclera.

Cornea

- The cornea is best inspected by directing penlight obliquely from several positions.

Normal findings

- There should be no irregularities on the surface.
- Looks smooth.
- The cornea is clear or transparent. The features of the iris should be fully visible through the cornea.
- There is a positive corneal reflex.

Anterior Chamber and Iris

- The anterior chamber and the iris are easily inspected in conjunction with the cornea. The technique of oblique illumination is also useful in assessing the anterior chamber.

Normal Findings

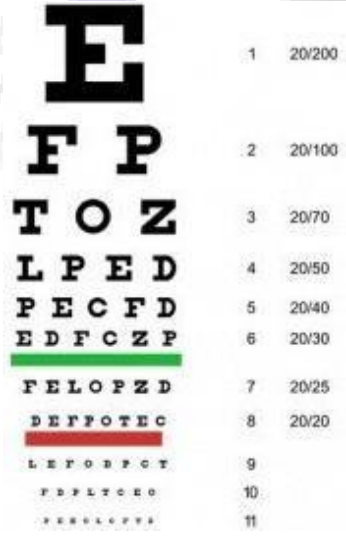
- The anterior chamber is transparent.
- No noted ~~any~~ visible materials.
- Color of the iris depends on the person's race (black, blue, brown or green).
- From the side view, the iris should appear flat and should not be bulging forward. There should be NO crescent shadow casted on the other side when illuminated from one side.

Pupils

- Examination of the pupils involves several inspections, including assessment of the size, shape reaction to light is directed is observed for direct response of constriction. Simultaneously, the other eye is observed for consensual response of constriction.
- The test for papillary accommodation is the examination for the change in pupillary size as it is switched from a distant to a near object.
- Ask the client to stare at the objects across room.
- Then ask the client to fix his gaze on the examiner's index fingers, which is placed 5 inches from the client's nose.
- Visualization of distant objects normally causes pupillary dilation and visualization of nearer objects causes pupillary constriction and convergence of the eye.

Normal Findings

- Pupillary size ranges from 3-7 mm, and are equal in size.
- Equally round.
- Constrict briskly/sluggishly when light is directed to the eye, both directly and consensual.
- Pupils dilate when looking at distant objects, and constrict when looking at nearer objects.
- If all of which are met, we document the findings using the notation PERRLA, pupils equally round, reactive to light, and accommodation.



A Snellen chart

- The optic nerve (Cranial Nerve II) is assessed by testing for visual acuity and peripheral vision.
- Visual acuity is tested using a Snellen chart, for those who are illiterate and unfamiliar with the western alphabet, the illiterate E chart, in which the letter E faces in different directions, maybe used.
- The chart has a standardized number at the end of each line of letters; these numbers indicates the degree of visual acuity when measured at a distance of 20 feet.

- The numerator 20 is the distance in feet between the chart and the client, or the standard testing distance. The denominator 20 is the distance from which the normal eye can read the lettering, which correspond to the number at the end of each letter line; therefore the larger the denominator the poorer the version.
- Measurement of 20/20 vision is an indication of either refractive error or some other optic disorder.
- In testing for visual acuity you may refer to the following:
  - The room used for this test should be well lighted.
  - A person who wears corrective lenses should be tested with and without them to check for the adequacy of correction.
  - Only one eye should be tested at a time; the other eye should be covered by an opaque card or eye cover, not with client's finger.
  - Make the client read the chart by pointing at a letter randomly at each line; maybe started from largest to smallest or vice versa.
  - A person who can read the largest letter on the chart (20/200) should be checked if they can perceive hand movement about 12 inches from their eyes, or if they can perceive the light of the penlight directed to their yes.

Peripheral vision or visual fields

- The assessment of visual acuity is indicative of the functioning of the macular area, the area of central vision. However, it does not test the sensitivity of the other areas of the retina which perceive the more peripheral stimuli. The Visual field confrontation test, provide a rather gross measurement of peripheral vision.
- The performance of this test assumes that the examiner has normal visual fields, since that client's visual fields are to be compared with the examiners.

Follow the steps on conducting the test:

- The examiner and the client sit or stand opposite each other, with the eyes at the same, horizontal level with the distance of 1.5 – 2 feet apart.
- The client covers the eye with opaque card, and the examiner covers the eye that is opposite to the client covered eye.
- Instruct the client to stare directly at the examiner's eye, while the examiner stares at the client's open eye. Neither looks out at the object approaching from the periphery.
- The examiner holds an object such as pencil or penlight, in his hand and gradually moves it in from the periphery of both directions horizontally and from above and below.
- Normally the client should see the same time the examiners sees it. The normal visual field is 180 degrees.

2.6 Ears

- Inspect the auricles of the ears for parallelism, size position, appearance and skin color.
- Palpate the auricles and the mastoid process for firmness of the cartilage of the auricles, tenderness when manipulating the auricles and the mastoid process.
- Inspect the auditory meatus or the ear canal for color, presence of cerumen, discharges, and foreign bodies.
- For adult pull the pinna upward and backward to straighten the canal.
- For children pull the pinna downward and backward to straighten the canal
- Perform otoscopic examination of the tympanic membrane, noting the color and landmarks.

Normal Findings

- The ear lobes are bean shaped, parallel, and symmetrical.
- The upper connection of the ear lobe is parallel with the outer canthus of the eye.
- Skin is same in color as in the complexion.
- No lesions noted on inspection.
- The auricles are has a firm cartilage on palpation.
- The pinna recoils when folded.
- There is no pain or tenderness on the palpation of the auricles and mastoid process.
- The ear canal has normally some cerumen of inspection.
- No discharges or lesions noted at the ear canal.
- On otoscopic examination the tympanic membrane appears flat, translucent and pearly gray in color.

2.7 Nose and Paranasal Sinuses

- The external portion of the nose is inspected for the following:
  - Placement and symmetry.
  - Patency of nares (done by occluding a nostril one at a time, and noting for difficulty in breathing)

- Flaring of alae nasi
- Discharge

- The external nares are palpated for:
  - Displacement of bone and cartilage.
  - For tenderness and masses
  - The internal nares are inspected by hyper extending the neck of the client, the ulnar aspect of the examiners hard over the fore head of the client, and using the thumb to push the tip of the nose upward while shining a light into the nares.

- Inspect for the following:
  - Position of the septum.
  - Check septum for perforation. (Can also be checked by directing the lighted penlight on the side of the nose, illumination at the other side suggests perforation).
  - The nasal mucosa (turbinates) for swelling, exudates and change in color.

Paranasal Sinuses

- Examination of the paranasal sinuses is indirectly. Information about their condition is gained by inspection and palpation of the overlying tissues. Only frontal and maxillary sinuses are accessible for examination.
- By palpating both cheeks simultaneously, one can determine tenderness of the maxillary sinusitis, and pressing the thumb just below the eyebrows, we can determine tenderness of the frontal sinuses.

Normal Findings

- Nose in the midline
- No Discharges.
- No flaring alae nasi.
- Both nares are patent.
- No bone and cartilage deviation noted on palpation.
- No tenderness noted on palpation.
- Nasal septum in the mid line and not perforated.
- The nasal mucosa is pinkish to red in color. (Increased redness turbinates are typical of allergy).
- No tenderness noted on palpation of the paranasal sinuses.

2.8 Mouth and Oropharynx, Lips

Inspected for:

- Symmetry and surface abnormalities
- Color
- Edema

Normal Findings

- With visible margin
- Symmetrical in appearance and movement
- Pinkish in color
- No edema

Temporomandibular Joint

- Palpate while the mouth is opened wide and then closed for:
  - Crepitus
  - Deviations
  - Tenderness

Normal Findings

- Moves smoothly no crepitus.
- No deviations noted
- No pain or tenderness on palpation and jaw movement.

Gums Inspected for:

- Color
- Bleeding
- Retraction of gums.

Normal Findings

- Pinkish in color
- No gum bleeding
- No receding gums

Teeth

Inspected for:

- Number
- Color
- Dental carries
- Dental fillings
- Alignment and malocclusions (2 teeth in the space for 1, or overlapping teeth)
- Tooth loss
- Breath should also be assessed during the process.

Normal Findings

- 28 for children and 32 for adults.
- White to yellowish in color
- With or without dental carries and/or dental fillings.
- With or without malocclusions.
- No halitosis.

Tongue

Palpated for:

- Texture

Normal Findings

- Pinkish with white taste buds on the surface.
- No lesions noted.
- No varicosities on ventral surface.
- Frenulum is thin attaches to the posterior 1/3 of the ventral aspect of the tongue.
- Gag reflex is present.
- Able to move the tongue freely and with strength.
- Surface of the tongue is rough.

Uvula

Inspected for:

- Position
- Color
- Cranial Nerve X (Vagus nerve) - Tested by asking the client to say “Ah” note that the uvula will move upward and forward.

Normal Findings

- Positioned in the mid line.
- Pinkish to red in color.
- No swelling or lesion noted.
- Moves upward and backwards when asked to say “ah”

Throat

Tonsils

Inspected for:

- Inflammation
- Size
- A Grading system used to describe the size of the tonsils can be used.
  - Grade 1 – Tonsils behind the pillar.
  - Grade 2 – Between pillar and uvula.
  - Grade 3 – Touching the uvula
  - Grade 4 – In the midline.

2.9 Neck

- The neck is inspected for position symmetry and obvious lumps visibility of the thyroid gland and Jugular Venous Distension
- Check the Range of Movement of the neck.

Normal Findings

- The neck is straight.
- No visible mass or lumps.
- Symmetrical
- No jugular venous distension (suggestive of cardiac congestion).
- The neck is palpated just above the suprasternal note using the thumb and the index finger.

Normal Findings

- The trachea is palpable.
- It is positioned in the line and straight.
- Lymph nodes are palpated using palmar tips of the fingers via systemic circular movements. Describe lymph nodes in terms of size, regularity, consistency, tenderness and fixation to surrounding tissues.

Normal Findings

- May not be palpable. Maybe normally palpable in thin patients.
- Non tender if palpable.
- Firm with smooth rounded surface.
- Slightly movable.
- About less than 1 cm in size.
- The thyroid is initially observed by standing in front of the patient and asking the patient to swallow. Palpation of the thyroid can be done either by posterior or anterior approach.

Posterior Approach:

1. Let the patient sit on a chair while the examiner stands behind him.
2. In examining the isthmus of the thyroid, locate the cricoid cartilage and directly below that is the isthmus.
3. Ask the patient to swallow while feeling for any enlargement of the thyroid isthmus.
4. To facilitate examination of each lobe, the client is asked to turn his head slightly toward the side to be examined to displace the sternocleidomastoid, while the other hand of the examiner pushes the thyroid cartilage towards the side of the thyroid lobe to be examined.
5. Ask the patient to swallow as the procedure is being done.
6. The examiner may also palpate for thyroid enlargement by placing the thumb deep to and behind the sternocleidomastoid muscle, while the index and middle fingers are placed deep to and in front of the muscle.
7. Then the procedure is repeated on the other side.

Anterior approach:

1. The examiner stands in front of the patient and with the palmar surface of the middle and index fingers palpates below the cricoid cartilage.
2. Ask the patient to swallow while palpation is being done.
3. In palpating the lobes of the thyroid, similar procedure is done as in posterior approach. The patient is asked to turn his head slightly to one side and then the other of the lobe to be examined.
4. Again the examiner displaces the thyroid cartilage towards the side of the lobe to be examined.

5. Again, the examiner palpates the area and hooks thumb and fingers around the sternocleidomastoid muscle.

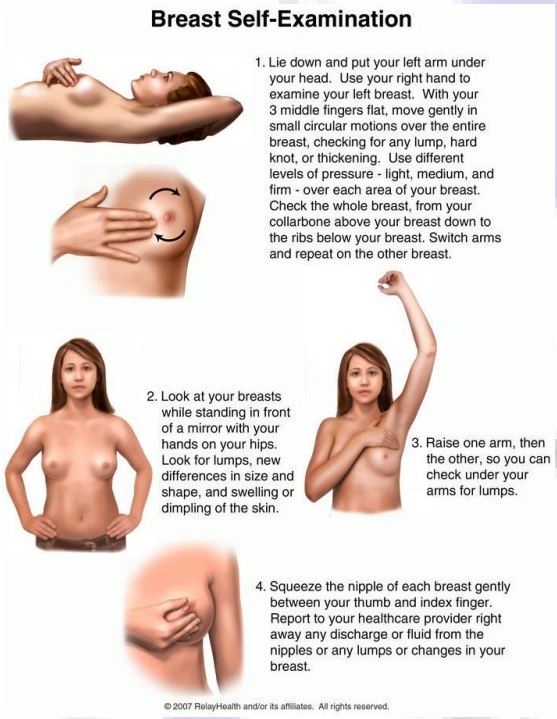
Normal Findings

- Normally the thyroid is non palpable.
- Isthmus maybe visible in a thin neck.
- No nodules are palpable.
- Auscultation of the Thyroid is necessary when there is thyroid enlargement. The examiner may hear bruits, as a result of increased and turbulence in blood flow in an enlarged thyroid.

3. Anterior and Posterior Thorax (Breast & Axillae, Thorax, Lungs and Heart)

3.1 Breast and Axilla

Breast



Inspection of the Breast

- There are 4 major sitting position of the client used for clinical breast examination. Every patient should be examined in each position.
  - The patient is seated with her arms on her side
  - The patient is seated with her arms abducted over the head.
  - The patient is seated and is pushing her hands into her hips, simultaneously eliciting contraction of the pectoral muscles.
  - The patient is seated and is learning over while the examiner assists in supporting and balancing her.
- While the patient is performing these manoeuvres, the breasts are carefully observed for symmetry, bulging, retraction, and fixation.
- An abnormality may not be apparent in the breasts at rest a mass may cause the breasts, through invasion of the suspensory ligaments, to fix, preventing them from upward movement in position 2 and 4.
- Position 3 specifically assists in eliciting dimpling if a mass has infiltrated and shortened suspensory ligaments.

Normal Findings

- The overlying the breast should be even.
- May or may not be completely symmetrical at rest.
- The areola is rounded or oval, with same color, (Color varies form light pink to dark brown depending on race).
- Nipples are rounded, everted, same size and equal in color.
- No “orange peel” skin is noted which is present in edema.
- The veins maybe visible but not engorge and prominent.

- No obvious mass noted.
- Not fixated and moves bilaterally when hands are abducted over the head, or is learning forward.
- No retractions or dimpling.

Palpation of the Breast

- Palpate the breast along imaginary concentric circles, following a clockwise rotary motion, from the periphery to the center going to the nipples. Be sure that the breast is adequately surveyed. Breast examination is best done 1 week post menses.
- Each areolar areas are carefully palpated to determine the presence of underlying masses.
- Each nipple is gently compressed to assess for the presence of masses or discharge.

Normal Findings

- No lumps or masses are palpable.
- No tenderness upon palpation.
- No discharges from the nipples.
- NOTE: The male breasts are observed by adapting the techniques used for female clients. However, the various sitting position used for woman is unnecessary.

Axillae

The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

3.2 Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to identify normal and abnormal sounds over the thorax.

3.3 Lungs

Auscultation: The assessment of normal and adventitious breath sounds is done by auscultation.

Percussion: It is done to assess normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

3.4 Heart

Inspection of the Heart

- The chest wall and epigastrium is inspected while the client is in supine position. Observe for pulsation and heaves or lifts

Normal Findings

- Pulsation of the apical impulse maybe visible. (this can give us some indication of the cardiac size).
- There should be no lift or heaves.

Palpation of the Heart

- The entire precordium is palpated methodically using the palms and the fingers, beginning at the apex, moving to the left sternal border, and then to the base of the heart.

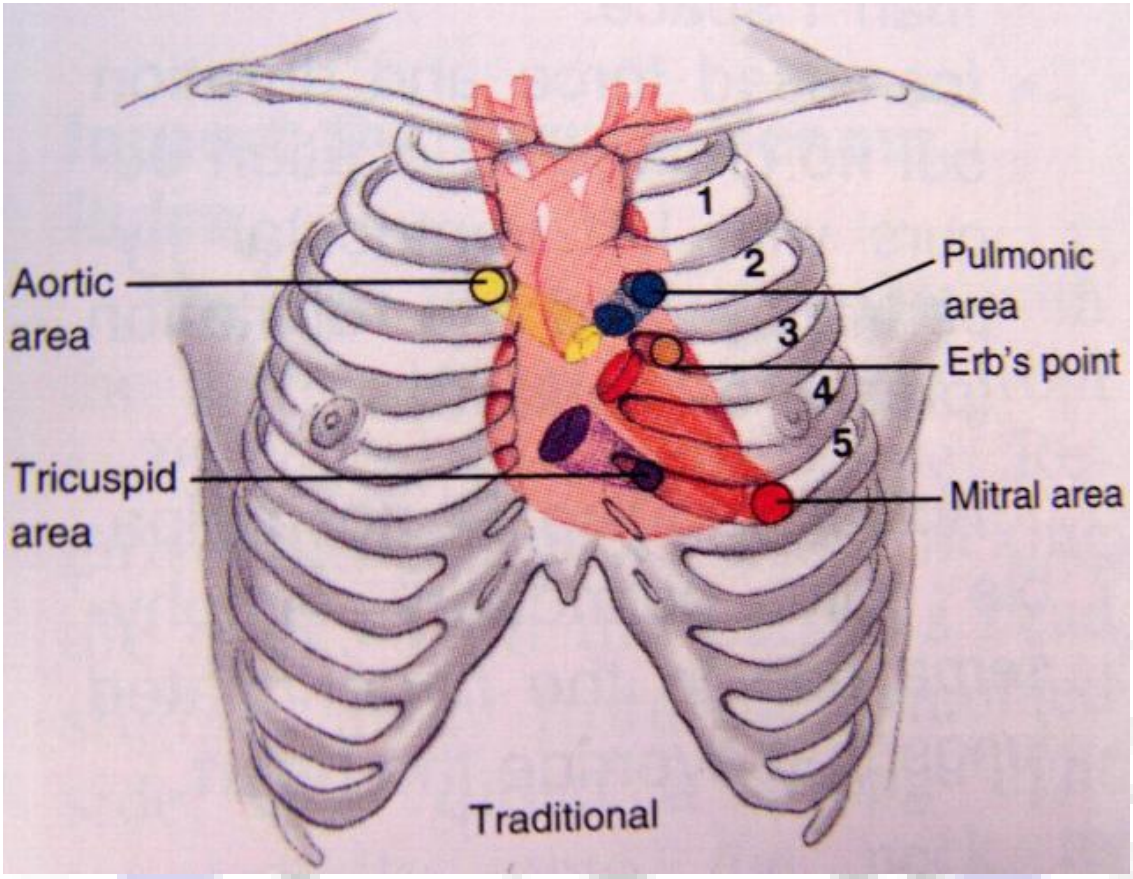
Normal Findings

- No, palpable pulsation over the aortic, pulmonic, and mitral valves.
- Apical pulsation can be felt on palpation.
- There should be no noted abnormal heaves, and thrills felt over the apex.

Percussion of the Heart

- The technique of percussion is of limited value in cardiac assessment. It can be used to determine borders of cardiac dullness.

Auscultation of the Heart



- Anatomic areas for auscultation of the heart:
  - Aortic valve – Right 2nd ICS sternal border.
  - Pulmonic Valve – Left 2nd ICS sternal border.
  - Tricuspid Valve – Left 5th ICS sternal border.
  - Mitral Valve – Left 5th ICS midclavicular line

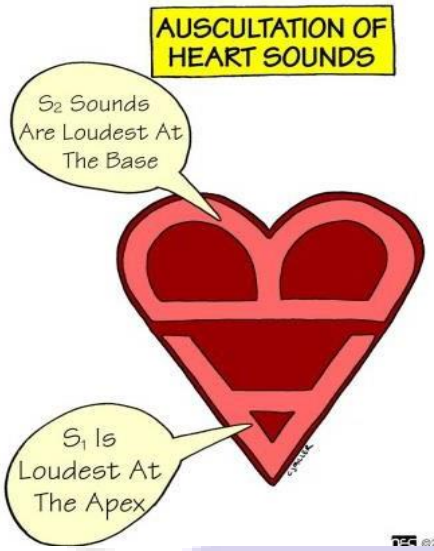
Positioning the patient for auscultation:

1. If the heart sounds are faint or undetectable, try listening to them with the patient seated and learning forward, or lying on his left side, which brings the heart closer to the surface of the chest.
2. Having the patient seated and learning forward s best suited for hearing high-pitched sounds related to semilunar valves problem.
3. The left lateral recumbent position is best suited low-pitched sounds, such as mitral valve problems and extra heart sounds.

Auscultating the heart:

1. Auscultate the heart in all anatomic areas aortic, pulmonic, tricuspid and mitral
2. Listen for the S1 and S2 sounds (S1 closure of AV valves; S2 closure of semilunar valve). S1 sound is best heard over the mitral valve; S2 is best heard over the aortric valve.
3. Listen for abnormal heart sounds e.g. S3, S4, and Murmurs.
4. Count heart rate at the apical pulse for one full minute.

Auscultation of Heart Sounds



Normal Findings

- S1 & S2 can be heard at all anatomic site.
- No abnormal heart sounds is heard (e.g. Murmurs, S3 & S4).
- Cardiac rate ranges from 60-100 bpm.

4. Abdomen

In abdominal assessment, be sure that the client has emptied the bladder for comfort. Place the client in a supine position with the knees slightly flexed to relax abdominal muscles.

Inspection of the abdomen

- Inspect for skin integrity (Pigmentation, lesions, striae, scars, veins, and umbilicus).
- Contour (flat, rounded, scapold)
- Distension
- Respiratory movement
- Visible peristalsis
- Pulsations

Normal Findings

- Skin color is uniform, no lesions.
- Some patients may have striae or scar.
- No venous engorgement.
- Contour may be flat, rounded or scaphoid
- Thin patients may have visible peristalsis.
- Aortic pulsation maybe visible on thin clients.

Auscultation of the Abdomen

- This method precedes percussion because bowel motility, and thus bowel sounds, may be increased by palpation or percussion.
- The stethoscope and the hands should be warmed; if they are cold, they may initiate contraction of the abdominal muscles.
- Light pressure on the stethoscope is sufficient to detect bowel sounds and bruits. Intestinal sounds are relatively high-pitched; the bell may be used in exploring arterial murmurs and venous hum.

Peristaltic sounds

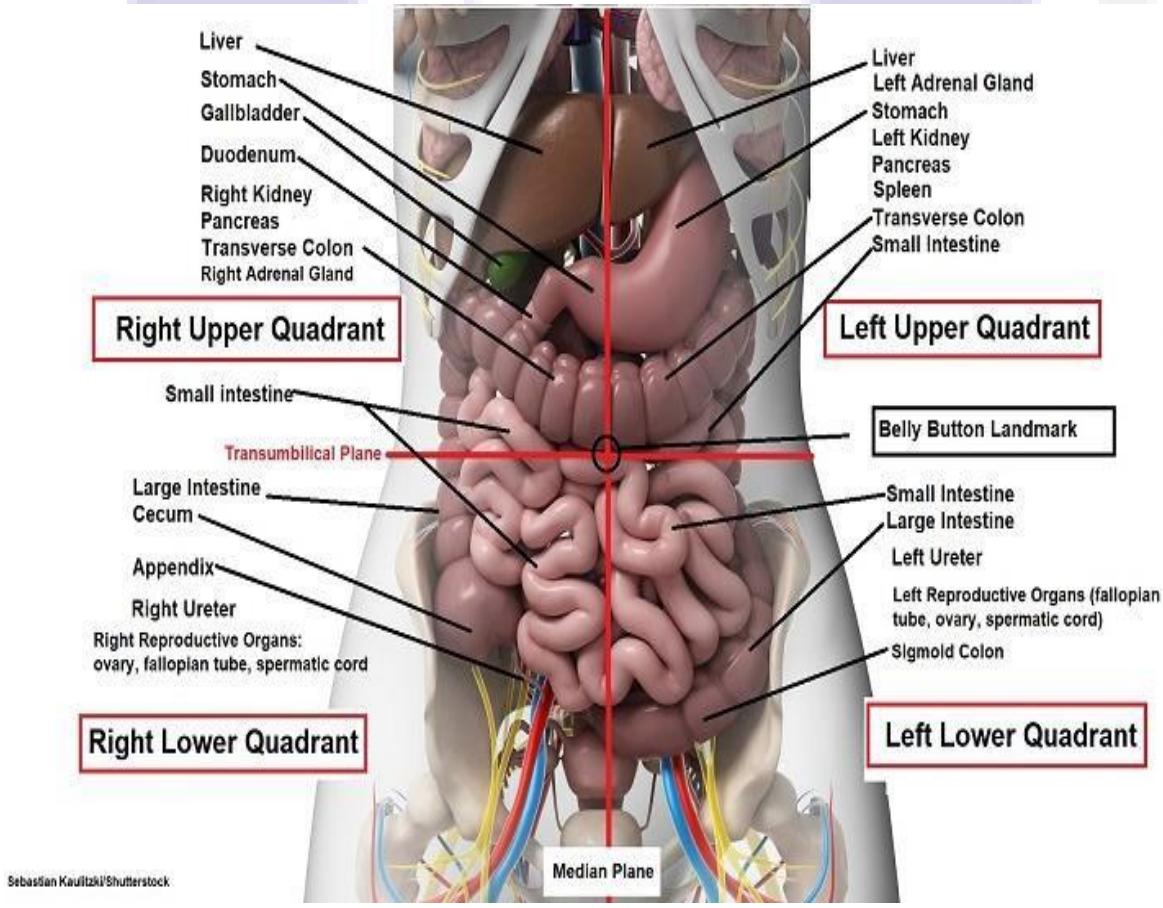
- These sounds are produced by the movements of air and fluids through the gastrointestinal tract. Peristalsis can provide diagnostic clues relevant to the motility of bowel.
- Listening to the bowel sounds (borborygmi) can be facilitated by following these steps:

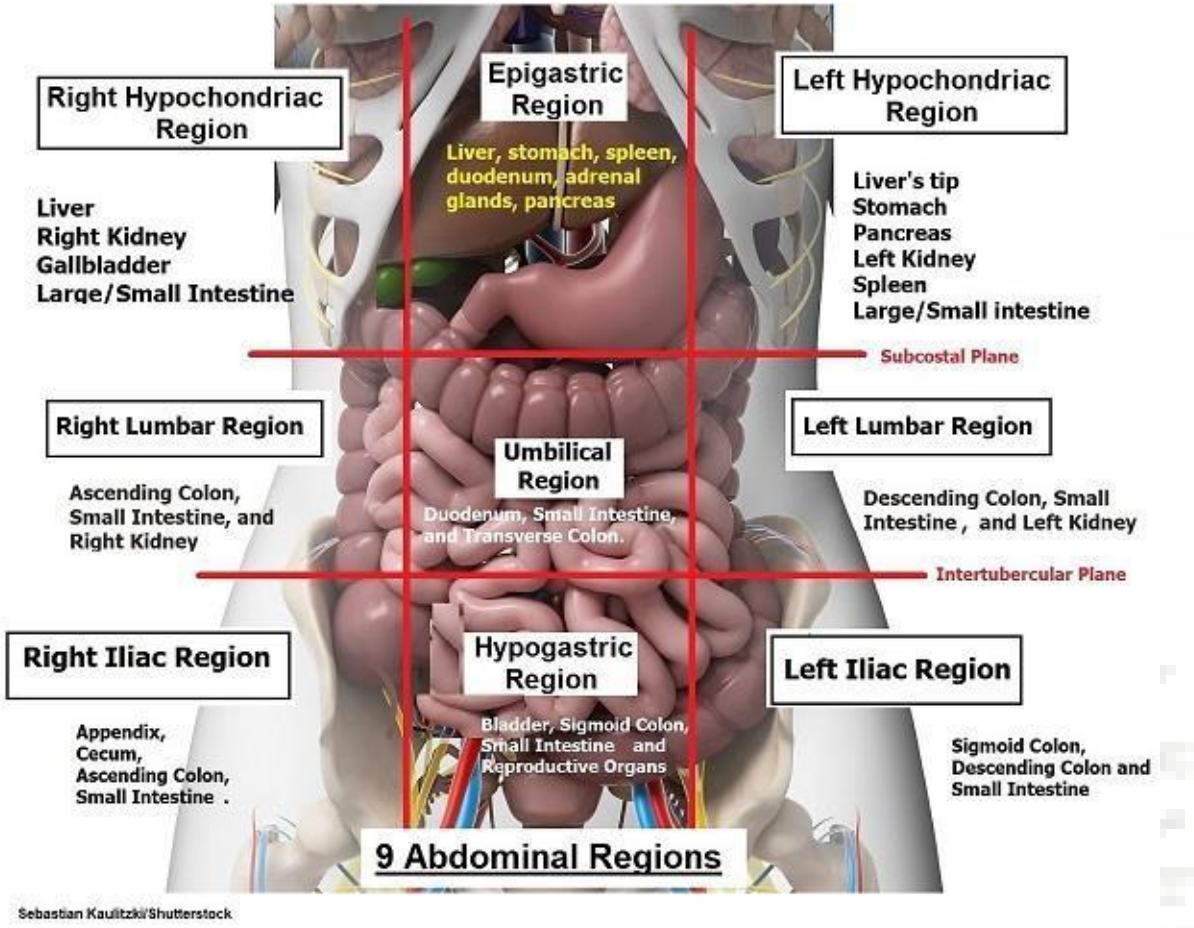
- Divide the abdomen in four quadrants.
- Listen over all auscultation sites, starting at the right lower quadrants, following the cross pattern of the imaginary lines in creating the abdominal quadrants. This direction ensures that we follow the direction of bowel movement.
- Peristaltic sounds are quite irregular. Thus it is recommended that the examiner listen for at least 5 minutes, especially at the periumbilical area, before concluding that no bowel sounds are present.
- The normal bowel sounds are high-pitched, gurgling noises that occur approximately every 5 – 15 seconds. It is suggested that the number of bowel sound may be as low as 3 to as high as 20 per minute, or roughly, one bowel sound for each breath sound.
- Some factors that affect bowel sound:
  - Presence of food in the GI tract.
  - State of digestion.
  - Pathologic conditions of the bowel (inflammation, Gangrene, paralytic ileus, peritonitis).
  - Bowel surgery
  - Constipation or Diarrhoea.
  - Electrolyte imbalances.
  - Bowel obstruction.

Percussion of the abdomen

- Abdominal percussion is aimed at detecting fluid in the peritoneum (ascites), gaseous distension, and masses, and in assessing solid structures within the abdomen.
- The direction of abdominal percussion follows the auscultation site at each abdominal guardant as detailed below.

The abdomen can be divided into four quadrants or nine regions as follows.





- The entire abdomen should be percussed lightly or a general picture of the areas of tympani and dullness.
- Tympany will predominate because of the presence of gas in the small and large bowel. Solid masses will percuss as dull, such as liver in the RUQ, spleen at the 6th or 9th rib just posterior to or at the mid axillary line on the left side.
- Percussion in the abdomen can also be used in assessing the liver span and size of the spleen.

Percussion of the liver

- The palms of the left hand are placed over the region of liver dullness.
- The area is striked lightly with a fisted right hand.
- Normally tenderness should not be elicited by this method.
- Tenderness elicited by this method is usually a result of hepatitis or cholecystitis.

Renal Percussion

- Can be done by either indirect or direct method.
- Percussion is done over the costovertebral junction.
- Tenderness elicited by such method suggests renal inflammation.

Palpation of the Abdomen Light

palpation

- It is a gentle exploration performed while the client is in supine position. With the examiner's hands parallel to the floor.
- The fingers depress the abdominal wall, at each quadrant, by approximately 1 cm without digging, but gently palpating with slow circular motion.
- This method is used for eliciting slight tenderness, large masses, and muscles, and muscle guarding.
- Tensing of abdominal musculature may occur because of:
  - The examiner's hands are too cold or are pressed to vigorously or deep into the abdomen.
  - The client is ticklish or guards involuntarily.
  - Presence of subjacent pathologic condition.

Normal Findings

- No tenderness noted.
- With smooth and consistent tension.
- No muscles guarding.

*Deep Palpation

It is the indentation of the abdomen performed by pressing the distal half of the palmar surfaces of the fingers into the abdominal wall.

- The abdominal wall may slide back and forth while the fingers move back and forth over the organ being examined.
- Deeper structures, like the liver, and retro peritoneal organs, like the kidneys, or masses may be felt with this method.
- In the absence of disease, pressure produced by deep palpation may produce tenderness over the cecum, the sigmoid colon, and the aorta.

Liver palpation

- There are two types of bi manual palpation recommended for palpation of the liver. The first one is the superimposition of the right hand over the left hand.
  - Ask the patient to take 3 normal breaths.
  - Then ask the client to breathe deeply and hold. This would push the liver down to facilitate palpation.
  - Press hand deeply over the RUQ
- The second methods:
  - The examiner's left hand is placed beneath the client at the level of the right 11th and 12th ribs.
  - Place the examiner's right hands parallel to the costal margin or the RUQ.
  - An upward pressure is placed beneath the client to push the liver towards the examining right hand, while the right hand is pressing into the abdominal wall.
  - Ask the client to breathe deeply.
  - As the client inspires, the liver maybe felt to slip beneath the examining fingers.

*Percussion and Palpation of deep structures such as liver and kidneys to be done under supervision

Normal Findings

- The liver usually cannot be palpated in a normal adult. However, in extremely thin but otherwise well individuals, it may be felt the coastal margins.
- When the normal liver margin is palpated, it must be smooth, regular in contour, firm and non-tender.

5. Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female clients. The penis, urethral meatus, and the scrotum are inspected among male clients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male clients.

6. Rectum and Anus

Inspection: The rectum, anus and the surrounding area is examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

7. Extremities (Musculoskeletal system& Peripheral Vascular System)

Inspection

- Observe for size, contour, bilateral symmetry, and involuntary movement.
- Look for gross deformities, edema, presence of trauma such as ecchymosis or other discoloration.
- Always compare both extremities.

Palpation

- Feel for evenness of temperature. Normally it should be even for all the extremities.
- Tonicity of muscle. (Can be measured by asking client to squeeze examiner's fingers and noting for equality of contraction).
- Perform range of motion.
- Test for muscle strength (performed against gravity and against resistance and described in the table below:

Table showing the Lovett scale for grading for muscle strength and functional level

Grade	Muscle function level	Lovett Scale
0	0% of normal strength	0 (Zero)
1	10% of normal strength; no movement, contraction of muscle is palpable or visible	T (Trace)
2	25% of normal strength; full muscle movement against gravity	P (Poor)
3	50% of normal strength; normal movement against gravity	F (Fair)
4	75% of normal strength; normal movement against gravity and against minimal resistance	G (Good)
5	100% of normal strength; normal movement against gravity and against minimal resistance	N (Normal)

Normal Findings

- Both extremities are equal in size.
- Have the same contour with prominences of joints.
- No involuntary movements.
- No edema
- Color is even.
- Temperature is warm and even.
- Has equal contraction and even.
- Can perform complete range of motion.
- No crepitus must be noted on joints.
- Can counter act gravity and resistance on ROM.

Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

8. Neurological system

Neurological assessment **-** mental status includes level of consciousness (LOC), orientation, and memory.

Balance is assessed using the relatively simple Romberg test. The Romberg test is the test that law enforcement use to test people for drunkenness. Gait can be assessed by simply observing the client as they are walking or by coaching the person to walk heal to toe as the nurse observes the client for their gait.

Gross motor functioning is bilaterally assessed by having the client contract their muscles; and fine motor coordination and functioning is observed for both the upper and the lower extremities as the client manipulates objects.

Sensory functioning is determined by touching various parts of the body, bilaterally, with a pen or another blunt item while the client has their eyes closed. The client is prompted to report whether or not they feel the blunt item as the nurse touches the area. Similarly, a hot and cold object is placed on the skin on various parts of the body to assess temperature sensory functioning. The client will then report whether they feel heat, cold or nothing at all.

Kinesthetic sensations are assessed to determine the client's ability to perceive and report their bodily positioning without the help of visual cues.

Tactile sensory functioning is assessed for the client's ability to have stereognosis, extinction, one point discrimination and two point discrimination. One and two point discrimination relates to the client's ability to feel whether or not they have gotten one or two pin pricks that the nurse gently applies. Stereognosis is the

client's ability to feel and identify a familiar object while their eyes are closed. For example, the nurse may place a pen, a button or a paper clip in the client's hand to determine whether or not the client can identify the object without any visual cues. Extinction is the client's ability to identify whether or not they are being touched by the person doing the assessment with either one or two bilateral touches. For example, the nurse may touch both knees and then ask the client if they felt one or two touches while the client has their eyes closed.

8.1 Reflexes

Reflexes are automatic muscular responses to a stimulus. When reflexes are absent or otherwise altered, it can indicate a neurological deficit even earlier than other signs and symptoms of the neurological deficitappear.

Reflexes can be described as primitive and long term. Primitive reflexes are normally present at the time of birth and these reflexes normally disappear as the baby grows older; neurological deficits are suspected when these primitive reflexes remain beyond the point in time when they are expected to disappear. Reflexes, other than the primitive reflexes remain intact and active during the entire life span, under normal conditions.

Deep Tendon and Superficial Reflexes

A **deep tendon reflex** is often associated with muscle stretching. **Tendon reflex** tests are used to determine the integrity of the spinal cord and peripheral nervous system, and they can be used to determine the presence of a neuromuscular disease.

Superficial reflexes. **Superficial reflexes** are motor responses to scraping of the skin. They are graded simply as present or absent, although markedly asymmetrical responses should be considered abnormal as well

- **Pupil reflex:** Pupil reflexes include pupil dilation and pupil accommodation. The "PERLA" mnemonic for pupil reflexes stands for Pupils Equally Reactive to Light and Accommodation which is a normal finding. The pupil reflexes for their reactions to light are assessed by using a flash light in a darkened room. Pupils will normally dilate as the light is withdrawn and they will normally constrict when the light is brought close to the pupils. The pupils are assessed not only for their reaction to light, they are also assessed in terms of their accommodation. Normally, the pupils will dilate when an object is moved away from the eye and they will constrict as the object is being brought closer to the eye.
- **Plantar reflex:** The plantar reflex is elicited when the person performing this assessment strokes the bottom of the foot and the client's toes curl down. The Babinski sign occurs when the foot goes into dorsiflexion and the great toe curls up; this sign is an abnormal response to this stimulation and it can indicate the presence of deep vein thrombosis.
- **Biceps reflex:** This reflex is assessed by placing the thumb on the biceps tendon while the person is in a sitting position and then tapping the thumb with the Taylor hammer.
- **Triceps reflex:** This reflex is elicited by tapping the triceps tendon with the Taylor hammer above the elbow while the client has their hands on their legs when the client is in a sitting position.
- **Patellar tendon reflex:** This reflex, often referred to as the knee jerk reflex, is elicited by tapping the patellar area with the Taylor hammer.
- **Calcaneal reflex:** This reflex, often referred to as the Achilles reflex, isthe calcaneal reflex on the ankle with the Taylor hammer.
- **Gag reflex:** The gag reflex is elicited when the back of the mouth and the posterior tongue is stimulated with a tongue blade.
- **Blinking reflex:** This reflex is elicited when the eyes are touched or they are stimulated a sudden bright light or an irritant.
- An **abdominal reflex** is a superficial neurological **reflex** stimulated by stroking of the **abdomen** around the umbilicus. It can be helpful in determining the level of a CNS lesion.

All reflexes should be done bilaterally in rapid succession so that all differences between the right and the left reflexes can be determined and assessed. For example, when the person who is performing these assessments should assess the biceps reflex of the right arm and then immediately assess the biceps reflex of the left arm so that any differences or inequalities can be assessed and documented.

Reflexes

- Deep Tendon Reflexes (DTR)
  - Biceps (C5-C6)
  - Triceps (C7-C8)
  - Brachioradialis (C5-C6)
  - Quadriceps (Patellar) (L2-L4)
  - Achilles (L5-S2)
- Superficial Reflexes
  - Plantar Reflex/Babinski (L4-S2)
  - Abdominal Reflexes (Upper T8-T10) (Lower T10-T12)
  - Crematic Reflex (L1-L2)

Documenting Reflex Findings

Use these grading scales to rate the strength of each reflex in a deep tendon and superficial reflex assessment.

Deep tendon reflex grades

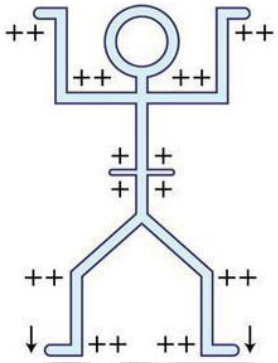
0 absent
+ present but diminished
+ + normal
+ + + increased but not necessarily pathologic
+ + + + hyperactive or clonic (involuntary contraction and relaxation of skeletal muscle)

Superficial reflex grades

0 absent
+ present

Use the patient's reflex ratings on a drawing of a stick figure. The figures here show documentation of normal and abnormal reflex responses.

Normal



8.2 Cranial nerves:

Lastly, the nurse assesses the twelve cranial nerves. Some of these twelve cranial nerves are only sensory or motor nerves, and others have both sensory and motor functions.

The twelve cranial nerves can be easily remembered using this mnemonic: On Old Olympus Tippy Top, A Fat Armed German View A Hop, as below:

1. Olfactory
2. Optic
3. Oculomotor
4. Trochlear
5. Trigeminal
6. Abducens
7. Facial
8. Acoustic
9. Glossopharyngeal
10. Vagus
11. Spinal accessory
12. Hypoglossal

Each of these twelve cranial nerves, their function and their classification as sensory, motor or both sensory and motor are shown in the table below.

Cranial Nerve I (Olfactory Nerve)

- To test the adequacy of function of the olfactory nerve:
  - The client is asked to close his eyes and occlude.
  - The examiner places aromatic and easily distinguished items nose (e.g. alcohol, vinegar, coffee).
  - Ask the client to identify the odor.
  - Each side is tested separately (**There is no need to use two different substances)**

Cranial Nerve II (Optic Nerve)

The optic nerve is assessed by testing for visual acuity and peripheral vision. **(Details shown in examination of eyes)**

Cranial Nerve III, IV & VI (Oculomotor, Trochlear, Abducens)

- All the 3 Cranial nerves are tested at the same time by assessing the Extra Ocular Movement (EOM) or the six cardinal position of gaze.

Follow the given steps:

- Stand directly in front of the client and hold a finger or a penlight about 1 ft from the client's eyes.
- Instruct the client to follow the direction the object hold by the examiner by eye movements only; that is without moving the neck.
- The nurse moves the object in a clockwise direction hexagonally.
- Instruct the client to fix his gaze momentarily on the extreme position in each of the six cardinal gazes.
- The examiner should watch for any jerky movements of the eye (nystagmus).
- Normally the client can hold the position and there should be no nystagmus.

Cranial Nerve V (Trigeminal) - While performing the cranial nerves assessment, the respective cranial nerve assessment can be incorporated in the respective systems.

1. **Sensory Function**
   - Ask the patient to close the eyes.
   - Run cotton wisp over the fore head, check and jaw on both sides of the face.
   - Ask the patient if he/she feel it, and where it is felt.
   - Check for corneal reflex using cotton wisp.
   - The normal response is blinking.
2. Motor function
   - Ask the patient to chew or clench the jaw. Palpate the jaw and feel for movement.
   - The patient should be able to clench or chew with strength and force.

Cranial Nerve VII (Facial)

1. Sensory function (This nerve innervates the anterior 2/3 of the tongue).
   - Place a sweet, sour, salty, or bitter substance near the tip of the tongue.
   - Normally, the client can identify the taste.
2. Motor function
   - Ask the patient to smile, frown, raise eye brow, close eye lids, whistle, or puff the cheeks.

Normal Findings

- Shape maybe oval or rounded.
- Face is symmetrical.
- No involuntary muscle movements.
- Can move facial muscles at will.
- Intact cranial nerve V and VII.

The summary table is given below:

Cranial Nerve		Major Functions		Assessment
Cranial Nerve I	Olfactory	Sensory	Smell	Smell—coffee, cloves, peppermint
Cranial Nerve II	Optic	Sensory	Vision	Visual acuity—Snellen chart (cover eye not being examined) Test for visual fields Examine with ophthalmoscope
Cranial Nerve III	Oculomotor	Sensory and Motor – Primarily Motor	Eyelid and eyeball movement	Move eye up, down, and peripherally Test for accommodation Pupillary constriction Observe for ptosis of upper eyelid
Cranial Nerve IV	Trochlear	Sensory and Motor – Primarily Motor	Innervates superior oblique eye muscle Turns eye downward and laterally	Inferior lateral movement of the eye
Cranial Nerve V	Trigeminal	Sensory and Motor	Chewing Face and mouth touch and pain	Corneal reflex Sensation of skin of the face (eyebrow, cheeks and chin) by using a wisp of cotton Chewing, biting, lateral jaw movements (move jaw side to side)
Cranial Nerve VI	Abducens	Sensory and Motor – Primarily Motor	Turns eye laterally Proprioception (sensory awareness of part of the body)	Inferior lateral eye movements
Cranial Nerve VII	Facial	Sensory and Motor	Controls most facial expressions Secretion of ears and saliva	Taste—anterior two thirds of tongue; sweet—sugar; salty; sour—lemon; bitter (rinse mouth between applications) Movement of forehead and mouth Raise eyebrows, show teeth, smile, and puff out cheeks
Cranial Nerve VIII	Vestibulocochlear (auditory)	Sensory	Hearing Equilibrium sensation	Hearing, balance Weber and Rinne tests Otoscope
Cranial Nerve IX	Glossopharyngeal	Sensory and Motor	Taste Senses carotid blood pressure Muscle sense – proprioception, sensory awareness of the body	Swallowing and phonation Taste—posterior one third of tongue; see cranial nerve VII
Cranial Nerve X	Vagus	Sensory and Motor	Senses aortic blood pressure Slows heart rate Stimulates digestive organs Taste	Sensations of posterior one third of tongue, throat. Gag reflex (stimulate back of pharynx with a tongue blade) Swallowing and phonation
Cranial Nerve XI	Spinal Accessory	Sensory and Motor – Primarily Motor	Controls trapezius and sternocleidomastoid controls swallowing movements Muscle sense - proprioception	Shoulder movement, shoulder shrug, head rotation—push against examiner's hand
Cranial Nerve XII	Hypoglossal	Sensory and Motor – Primarily Motor	Controls tongue movements Muscle sense - proprioception	Tongue movement—protrude tongue, push tongue into the cheek

(Berman, Snyder, Kozier & Erb, 2008; Jarvis, 2008).

Glasgow Coma Scale:

The **Glasgow Coma Scale** (**GCS**) allows healthcare professionals to consistently evaluate the consciousness level of a patient. There are three aspects of behaviour that are independently measured as part of an **assessment** of a patient's **GCS** – motor responsiveness, verbal response and eye-opening.

Feature	Response	Score
Best eye response	Open spontaneously	4
	Open to verbal command	3
	Open to pain	2
	No eye opening	1
Best verbal response	Orientated	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No verbal response	1
Best motor response	Obeys commands	6
	Localising pain	5
	Withdrawal from pain	4
	Flexion to pain	3
	Extension to pain	2
	No motor response	1

Terms and terminology relating to the neurological system and neurological system disorders

Acalculia: Acalculia is the client's loss of ability to perform relatively simple mathematical calculations like addition and subtraction.

Agnosia: Agnosia is defined as the loss of a client's ability to recognize and identify familiar objects using the senses despite the fact that the senses are intact and normally functioning. The different types of agnosia, as based on each of the five senses, are auditory agnosia, visual agnosia, gustatory agnosia, olfactory agnosia, and tactile agnosia.

Agraphia: Agraphia, simply defined, is the Inability of the client to write. Agraphia is one of the four hallmark symptoms of Gerstmann's syndrome. The other symptoms of Gerstmann's syndrome are acalculia, finger agnosia, and an inability to differentiate between right and left.

Alexia: Alexia, which is a type of receptive aphasia, occurs when the client is unable to process, understand and read the written word. This neurological disorder is also referred to as word blindness and optical alexia.

Anhedonia: Anhedonia is a loss of interest in life experiences and life itself as the result of the neurological deficit.

Anomia: Anomia is a lack of ability of the client to name a familiar object or item.

Anosagnosia: Anosagnosia is characterized with the client's inability to perceive and have an awareness of an affected body part such as a paralyzed or missing leg. Anosagnosia is closely similar to hemineglect and hemiattention

Anosdiaphoria: Anosdiaphoria is an indifference to one's illness and disability

Aphasia: Aphasia includes expressive aphasia and receptive aphasia. Expressive aphasia is characterized by the client's inability to express their feelings and wishes to others with the spoken word; and receptive aphasia is the client's inability to understand the spoken words of others.

Asomatognosi: Asomatognosia is the inability of the client to recognize one or more of their own bodily parts.

Astereognosia: Astereognosia is the client's inability to differentiate among different textures with their sense of touch and also the inability of the client to identify a familiar object, like a button, with their tactile sensation.

Asymbolia: Asymbolia is the loss of the client's inability to respond to pain even though they have the sensory function to feel and perceive the pain. Asymbolia is also referred to as pain dissociation and pain asymbolia.

Autotopagnosia: Autotopagnosia is the inability of the client to locate their own body parts, the body parts of another person, or the body parts of a medical model.

Balint's syndrome: Balint's syndrome includes ocular apraxia, optic ataxia and simultanagnosia, which consist of impaired visual scanning, visusopatial ability and attention.

Boston Diagnostic Aphasia Examination: The Boston Diagnostic Aphasia Examination is a standardized comprehensive assessment tool that assess and measures the client's degree of aphasia in terms of the client's perceptions, processing of these perceptions and responses to these perceptions while using problem solving and comprehension skills.

Broca's aphasia: Broca's aphasia entails the client's lack of ability to form and express words even though the client's level of comprehension is intact.

Color agnosia: Color agnosia reflects the client's lack of ability to recognize and name different colors.

Conduction aphasia: Conduction aphasia is the client's lack of ability to repeat phrases and/or write brief dictated passages despite the fact that the client has intact speech abilities, comprehension abilities, and the ability to name familiar objects.

Constructional apraxia: Constructional apraxia is the inability of the client to draw and copy simple shapes on paper.

Dressing apraxia: Dressing apraxia occurs when the person is not able to appropriately dress oneself because of some neurological dysfunction.

Dysgraphaesthesia: Dysgraphaesthesia impairs the client's ability to sense and identify a letter or number that is tactily drawn on the client's palm.

Dysgraphia: Dysgraphia is similar to agraphia; however, dysgraphia is difficulty in terms of writing and agraphia is the client's complete inability to write.

Environmental agnosia: Environmental agnosia is the lack of ability of the client to recognize familiar places, like the US Supreme Court, by looking at a photograph of it.

Finger agnosia: Finger agnosia occurs when the person is not able to identify what finger is being touched by the person performing the neurological assessment.

Geographic agnosia: Geographic agnosia is the lack of ability of the client to recognize familiar counties, like Canada or Mexico, when viewing a world map.

Gerstmann's Syndrome: Gerstmann's Syndrome consists of dyscalculia or acalculia, finger agnosia, one sided disorientation and dysgraphia or agraphia.

Hemiasomatognosia: Hemiasomatognosia is the neurological disorder that occurs when the client does not perceive one half of their body and they act in a manner as if that half of the body does not even exist.

Homonymous hemianopsia: Homonymous hemianopsia occurs when the person has neurological blindness in the same visual field of both eyes bilaterally.

Ideomotor apraxia: Ideomotor apraxia is a neurological deficit that affects the client's ability to pretend doing simple tasks of everyday living like brushing one's teeth.

Misoplegia: Misoplegia is a hatred and distaste for an adversely affected limb.

Motor alexia: Motor alexia occurs when the client is not able to comprehend the written word despite the fact that the client can read it aloud.

Musical alexia: Musical alexia is a client's inability to recognize a familiar tune like "The National Anthem" or "Silent Night".

Movement agnosia: Movement agnosia is a neurological deficit that is characterized with a client's lack of ability to recognize an object's movement.

Ocular apraxia: Ocular apraxia is the neurological deficit that occurs when the person is no longer able to rapidly move their eyes to observe a moving object.

Optic ataxia: Optic ataxia is characterized with the client's inability to reach for and grab an object.

Phonagnosia: Phonagnosia is the client's lack of ability to recognize familiar voices such as those of a child or spouse.

Prosopagnosia: Prosopagnosia is a lack of ability to recognize familiar faces, like the face of a spouse or child.

Simultanagnosia: Simultanagnosia is a neurological disorder that occurs when the client is not able to perceive and process the perception of more than object at a time that is in the client's visual field.

Somatophrenia: Somatophrenia occurs when the client denies the fact that their body parts are not even theirs, but instead, these body parts belong to another.

The Two-Point Discrimination Test: This test measures and assesses the client's ability to recognize more than one sensory perception, such as pain and touch, at one time.

Visual agnosia: Visual agnosia is the client's lack of ability to recognize and attach meaning to familiar objects.

Wechsler Memory Scale IV: Wechsler Memory Scale IV: This measurement tool is a standardized comprehensive method to assess verbal and visual memory, including immediate memory, delayed memory, auditory memory, visual memory and visual working memory.

SAMPLE HEALTH ASSESSMENT FORMAT (Adult)

Date :

Place :

Patient's Name :

Hospital No. :

Age :

Sex :

Occupation :

Residence :

Chief Complaint :

History of present illness or problems:
History of Treatment :

Current Health status

Nutrition :
Elimination :

Sleep :

Immunizations :

Screening tests :

Allergies :

Medications :

Daily activities :

High risk behaviors :
- Alcohol
- Drug
- Cigarette usage
- Sexual behaviours

Past medical history

Illness :

Injuries :

Hospitalization/Surgeries

Family History:

Family profile & genogram Family

medical history Socio-

economic background

Physical Examination: Vital

signs

Temperature Pulse

Respiration

Blood Pressure

Height

Weight

BMI

General appearance Skin

and nails: Head and

face:

Eyes Ears

Nose

Mouth

Neck

Lymph nodes

Chest

Heart and CVS

Breast exam

Abdomen

Musculo skeletal system:

Neurological system

Motor functions Sensory

Cranial nerves Reflexes

BLS/BCLS MODULE (Adult Health Nursing I)

PLACEMENT: III SEMESTER

Theory: 4 hours (Includes self-learning & lectures)

Practical: 6 hours (Includes demonstration, practice & OSCE)

Module Overview: The Indian CPR guidelines/AHA guidelines can be used to get certification. The required hours can be used from theory and practical hours. The hours may vary based on certification guidelines.

Competencies: The student will be able to

1. Perform Basic Cardiopulmonary Life Support (BCLS) using the evidence based national or international guidelines in the management of adult victims with cardiac arrest.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (BCLS/BLS competencies) - 20 marks

OR

As per certification guidelines

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resource: (Latest version to be consulted as and when revised)

- Indian CPR/BCLS guidelines
- International guidelines and certification - AHA guidelines

FUNDAMENTALS OF PRESCRIBING MODULE (Pharmacology II)

PLACEMENT: IV SEMESTER

Theory: 20 hours (Few hours of practice can be planned in skill lab/simulation lab)

Module Overview: The module covers the prescriptive role of nurses particularly nurse practitioners, legal issues relevant to prescribing, and principles, process, and steps of prescribing. Further the students will be oriented to prescribing competencies.

Competencies (Learning Outcomes): The student will be able to

1. Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.
2. Discuss professional, legal, and ethical issues relevant to prescribing practice.
3. Enumerate the principles of prescribing and factors influencing it.
4. Explain the process and steps of prescribing.
5. Identify the prescribing competencies.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Prescribing competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4	Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.	**Introduction** • Background • Prescriptive role of nurses and nurse practitioners • Prescribing terminology	• Lecture • Discussion	• MCQ • Short answers
II	T-6	Discuss professional, legal, and ethical issues relevant to prescribing practice.	**Professional, legal, and ethical issues relevant to prescribing practice.** • Professional issues • Legal issues • Ethical issues	• Lecture • Discussion • Guided reading	• Short answers • Written assignments
III	T-4	Enumerate the principles of prescribing and factors influencing it.	**Principles of prescribing** • Principles • Factors influencing prescribing	• Lecture & discussion • Self-study & Guided reading	• Short answers

IV	T-6	Explain the process and steps of prescribing. Identify the prescribing competencies and develop basic prescribing competencies.	**Process of prescribing and competencies** • Steps of prescribing • Prescribing competencies	• Lecture & discussion • Review of Case studies Field Observation and skill lab practice	• Short answers • Observation report • OSCE

Learning Resource: Fundamentals of Prescribing Module prepared by INC, given below.

FUNDAMENTALS OF PRESCRIBING MODULE

PART I: Introduction and background

Prescribing is the main approach to the treatment and prevention of diseases in healthcare. Medicines are used more than any other intervention by patients to manage clinical conditions. The number and complexity of medicines are growing and prescribers are expected to develop and maintain prescribing competencies. When prescribed and used effectively, medicines have the potential to significantly improve patient outcomes. Doctors are the largest group of prescribers along with dentists who are able to prescribe on registration. The prescribing responsibilities have extended to other health professional groups who are able to prescribe within their scope of practice.

Countries such as USA, UK, and Australia utilize the non- medical prescribers namely nurses, pharmacists, podiatrists, and physiotherapists keeping the principle of effective use of resources, their skills and expertise maintaining safety and efficiency of prescribing. In these countries, nurse-prescribing courses with hands on experience by designated medical practitioner train nurses to perform independent and supplementary prescribing. Adequately trained nurse practitioners on completion of approved course/modules, prescribe from a limited nurse's drug formulary and function within the standards of proficiency for nurse prescribers.

In India, the current practice is that only medical practitioners and dentists prescribe drugs on registration. Prescribing is included as a component of their undergraduate program. Nursing roles are changing and with the introduction of nurse practitioner programs in critical care, midwifery and primary care, there is a need to move towards empowering these nurses in terms of quality, standards, monitoring and evaluation. Their clinical expertise is also highly valued by patients. With introduction of legal provision for nurse practitioners by INC standards, scope of practice and regulations alongside MOH&FW regulations, and support and acceptance by medical and pharmacy councils, NPs in India will be involved in prescribing within their scope soon. Currently INC in collaboration with MOH & FW have finalized Scope of Practice Document for Nurse Practitioners in midwifery and is placed in INC and Ministry's websites. This will enable NPMs to

prescribe within their scope as indicated.

PART II: The Prescriptive the role of nurses and nurse Practitioners

The need for prescribing has emerged alongside introduction of Nurse Practitioner Critical Care (NPCC) and Nurse Practitioner Midwifery (NPM) programs. The prescriptive role, rights and legal provision by Indian Nursing Council (INC) and MOH&FW, GoI have been deliberated in depth with the finalization of the Scope of Practice for NPMs. This learning module on fundamental principles of prescribing is being integrated as part of Pharmacology course. The nurse practitioners in midwifery will be able to prescribe from a limited list of approved drugs as per the scope of practice while providing midwifery services in Midwife led Care Units (MLCUs). Restrictions may be set for the type of practitioners as per their qualification and registration as per INC standards and regulations. Nurse practitioners in critical care will be able to follow protocol driven drug administration integrating collaborative and shared care with medical practitioners.

Standards of proficiency (Nursing & Midwifery Council - NMC, UK)

Nurse prescribers must have sufficient knowledge and competence to

1. Assess a patient's clinical condition
2. Undertake a through health history that includes medication history
3. Diagnose and decide on management of the presenting condition and whether or not to prescribe where necessary
4. Identify appropriate products if medication is required
5. Advise the patient on effects and risks
6. Prescribe if patient agrees and as per legal provision
7. Monitor response to medication and lifestyle advice

Scope:

The legal provision, policy, rules and regulations of INC and Government policy, codes of professional conduct and practice and standards of proficiency by INC will guide the prescriptive practice of nurses, nurse midwives, and practitioners.

Aims of nurse prescribing: The proposed prescriptive role of nurse practitioners

- Enables nurse practitioners to provide high clinical standards and meet the patients' needs
- Provides the prescribers with legal constraints around prescribing with sound principles and policies of prescribing
- Assists them in maintaining and improving their prescribing competencies
- Empowers nurse prescribers with personal accountability for the prescribed medication

Definition of terms

1. **Nurse practitioner:** Is one who has successfully completed the educational program prescribed by INC and is registered with the appropriate nursing council.
2. **Prescriptive rights:** The prescriptive rights bestowed on the nurse practitioner by way of regulation and standards set by GOI/INC alongside other related agencies of India for drug control.
3. **Independent prescribing:** Involves prescribing independently by the one who is responsible and accountable for patients that includes assessment of undiagnosed or diagnosed conditions and for decisions about the clinical management required including prescribing particularly by the primary care practitioner.
4. **Shared/collaborative prescribing:** Prescribing limited to protocols of specific clinical settings in consultation/collaboration with medical practitioners
5. **Administration of medicines:** The act of giving a medicine to a person, which may include some activity to prepare the medicine to be administered

6. **Competencies:** The knowledge, skill, and behaviors needed to adequately perform the function.
7. **Medicines:** Therapeutic goods that are represented to achieve, or are likely to achieve their principal intended action by pharmacological, chemical, immunological or metabolic means in or on the body of a human.

Schedule medicines (e.g. controlled drugs, prescription - only medicines, pharmacist - only medicines. Pharmacy - only medicines)

Unscheduled medicines such as OTC medicines such as medicines on open sale that do not require prescription (e.g. small packets of analgesics, and complementary medicines also called herbal, natural, and alternative medicines. Complementary medicines include products containing herbs, vitamins, minerals, nutritional supplements, homoeopathic medicines and bush and traditional medicines). Medicines are also known as 'medications"

8. **Prescribing:** An iterative process involving steps of information gathering, clinical decision making, communication and evaluation that results in the initiation, continuation or cessation of a medicine
9. **Nurse prescriber:** Nurse Practitioners authorized to undertake prescribing within the scope of their practice.
10. **Scope of practice:** The areas and extent of practice by NPs defined by a regulatory body after taking into consideration their training, experience, expertise and demonstrated competencies

Assignments/Self-directed reading (SDL):

1. Review of literature - International trends of non-medical prescribing particularly nurse prescribing
2. Prescriptive role of Nurse Practitioner in UK, USA, Australia, Singapore and Thailand

PART III: Professional, legal and ethical issues relevant to prescribing

A comprehensive understanding of professional, legal and ethical issues is a fundamental component of safe prescribing practice. Changes with regard to education and training, professional regulations and country's legislations related to drugs and prescribing, supply and administration of medicines influence the prescribing practice and the professional accountability.

Professional Issues

Professional regulatory bodies guide the nonmedical prescribing by setting regulations for practice. Regulators of nurse prescribers are required to set standards of education, training, conduct and performance and approve educational programs that prepare nurse practitioner to prescribe. The professional regulators are Indian Nursing Council and State Nursing Council.

Nurse practitioners must work within the boundaries of professional codes of conduct by INC with the intention of providing high quality standards of healthcare, safeguarding the public and promoting professional credibility. Additional qualification and training are required for prescribing. NPs must be able to assume personal accountability and responsibility. Safe prescription standards by regulatory body should guide the NPs in their decision-making and writing prescription.

Legal issues

Knowledge about India's legislation is essential for NPs in their practice. The law sets the standards of behavior and can be defined as a rule or body of rules. The Drugs and Cosmetics Act (1940) and Rules (1945) with latest amendments provides rules and regulations related to drugs, control, license, governance, and import. Regulatory councils/Commissions for Nursing, Medical and pharmacy are also regulators. Central Drugs Standard Control Organization (CDSCO) is a central drug authority for discharging functions assigned to central government under the Drugs and Cosmetics Act. CDSCO serves as a regulatory control over import of drugs, approval of new drugs and clinical trials, approval of licenses as central license approving authority and consists of a technical advisory board to advise on amendments to rules and regulations.

National Formulary of India, FDA and Acts of professional organizations guide prescribers in their safe and competent practice.

Ethical Issues

As prescribers, ethical dilemmas occur in their daily practice. They must draw combination of personal, group and philosophical ethics to assist in the decision- making. Ethical decisions must be guided by personal beliefs and values, professional code of conduct and the knowledge and analysis of ethical theories. The most essential ethical theories that

guide decision-making are consequentialism, deontology and virtue ethics. Decisions made considering the consequences are guided by the theory of consequentialism. Deontologists follow fundamental rules and consider duty and obligation are central to their decisions. Virtue ethics that involve compassion, honesty, loyalty, kindness and benevolence guide the prescribers to prescribe safely and effectively. Ethical principles such as autonomy, beneficence, non-maleficence and justice should also guide ethical decision-making. Professional integrity is an important element to be integrated in making ethical decisions.

Nurse practitioners must work within their professional codes of conduct and reflect on professional responsibility and accountability. Legal knowledge is essential for safe practice. They must apply moral and ethical theories in making ethical decisions while prescribing for their patients.

Assignments/SDL:

1. Laws and regulations relevant to drugs, prescribing and governance by GoI and professional regulatory bodies
2. International trends on legislation related to non-medical prescribing

PART IV: Principles and process of prescribing

Prescribing is one of the main approaches to treating and preventing diseases. In India, only medical practitioners perform it. It is also extended to other health professionals to use the resources maximally and thus it is extended to nurses particularly nurse practitioners in developed countries along with other health professionals (Eg. pharmacists, podiatrists, physiotherapists) who are also permitted to prescribe within restricted scope and limited formulary. All medicines have the capacity to enhance health however they also have the potential to cause harm if used inappropriately. For these reasons, all prescribers should follow principles of good prescribing. Bad prescribing can lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient and higher costs. They can also make the prescriber vulnerable to influences which can cause irrational prescribing such as patient pressure, bad example of colleagues and high powered salesmanship.

British pharmacological society recommends the following ten principles of prescribing

1. Be clear about the reasons for prescribing
   - Establish an accurate diagnosis whenever possible (although this may often be difficult)
   - Be clear in what the patient is likely to gain from the prescribed medicines.
2. Take into account the patient's medication history before prescribing
   - Obtain an accurate list of current and recent medications (including over-the counter and alternative medicines), prior adverse drug reactions, and drug allergies from the patient, their carers, or colleagues
3. Take into account other factors that might alter the benefits and risks of treatment
   - Consider other individual factors that might influence the prescription (e.g. physiological changes with age and pregnancy, or impaired kidney, liver or heart function)
4. Take into account the patient's ideas, concerns, and expectations
   - Seek to form a partnership with the patient when selecting treatments, making sure that they understand and agree with the reasons for talking the medicine
5. Select effective, safe and cost effective medicines individualized for the patient
   - The likely beneficial effect of the medicine should outweigh the extent of any potential harms, and whenever possible this judgement should be based on published evidence
   - Prescribe medicines that are unlicensed, off-lable or outside standard practice only if satisfied that an alternative medicine would not meet the patient's needs (this decision will be based on evidence and/or experience of their safety and efficacy)
   - Choose the best formulation, dose, frequency, route of administration, and duration of treatment
6. Adhere to national guidelines and local formularies where appropriate
   - Be aware of guidance produced by respected bodies (increasingly available via decision support systems), but always consider the individual needs of the patient
   - Select medicines with regard to costs and needs of other patients (health-care resources are finite)
   - Be able to identify, access, and use reliable and validate sources of information (e.g. National Formulary), and evaluate potentially less reliable information critically
7. Write unambiguous legal prescription using the correct documentation
   - Be aware of common factors that cause medication errors and know how to avoid them

8. Monitor the beneficial and adverse effects of medicines
    - Identify how the beneficial and adverse effects of treatment can be assessed
    - Understand how to alter the prescription as a result of this information
    - Know how to report adverse drug reactions
9. Communicate and document prescribing decisions and the reasons for them
    - Communicate clearly with patients, their carers, and colleagues
    - Give patients important information about how to take the medicine, what benefits might arise, adverse effects (especially those that will require urgent review), and any monitoring that is required
    - Use the health record and other means to document prescribing decisions accurately
10. Prescribe within the limitations of your knowledge, skill and experience
    - Always seek to keep the knowledge and skills that are relevant to your practice up to date
    - Be prepared to seek the advice and support of suitably qualified professional colleagues
    - Make sure that, where appropriate prescriptions are checked (e.g. calculations of intravenous doses)

Factors influencing prescribing

Prescribing is complex and every consultation is unique. To ensure safety and cost effective prescribing, the practitioners need to be aware of various factors that can influence prescribing. Adhering to principles of good prescribing is the first and foremost essential component that significantly influences prescribing practice. The other factors are discussed below. The major factors include prescriber related factors, patient related factors, product related factors and other professionals.

Prescriber related factors

The personal characteristics of the prescriber have a significant impact on the prescribing. Personal beliefs and values are important influences in selection of treatment and products. The confidence of the practitioner is enhanced by additional qualification, training, and experience. The practitioner's role change and responsibility can be influencing factors. Appropriate remuneration also positively influences their performance. Organizational resources, culture and support are other factors. Professional codes of conduct protect the practitioner and public. Government guidelines, INC standards and guidelines and legal provision in the act guide the practitioners to perform safe and effective prescribing.

Patient related factors

Consultation process is vital in making decisions for safe and effective prescribing. A structured approach to history taking with well-developed history-taking skills by the practitioners is required. Access to appropriate records indicating past health history and treatment history along with comprehensive history will provide sufficient information required to make decisions related to prescribing. A therapeutic relationship with the patient and communication is sure to enhance the success of prescribing. It is important to know the expectations of patients before generating the prescription. The practitioner needs to know the various options available before choosing the drug treatment. The patient's emotions, distress and anxiety can influence the prescribing consultation and their ability to convey accurate information or receive instructions and information about taking medication and observing for drug side effects. The patient is a consumer and practitioners should be vigilant to provide maximum patient safety by ensuring adequate knowledge about drugs, their side effects, potential drug interactions and adverse reactions. The skills of pharmaco-vigilance is highly important for practitioners. Patient's culture is another influencing factor. The awareness of the dynamics that result from cultural differences such as value preferences, perception of illness, health beliefs and communication style will help practitioners adapt treatment plants that meet the culturally unique needs.

Product related factors

The choice of the product, availability and access to formularies, external influences such as pharmaceutical companies and media are some of the major influencing factors. Every practitioner needs to ensure adequate knowledge about relevant national guidelines with evidence and local prescribing protocols. The choice of the product should be based on the formulary designed for nurse practitioner's use. Effectiveness and cost need to be considered first. National Formulary of India serves as a guideline for prescribers in India. Pharmaceutical companies are growing tremendously. The practitioners need to be aware of approved and licensed companies by the drug controlling authority of India. The advertisements and media about various products and companies also attempt to influence the prescribing decisions. Practitioners need to be aware of the fact and maintain healthy and professional relationship if required and utilize ethical principles and evidence base for making prescribing decisions.

Other professionals

Multidisciplinary team working and collaboration are emphasized greatly in healthcare. The success of prescribing by practitioners depends largely by cultivating sound and effective relationship with medical practitioners and hospital managers. The role of nurse practitioners in prescribing needs to be communicated to doctors and other healthcare professionals and is to be well understood. Communication and transfer of information are cornerstones for safe prescribing practice. The above-mentioned factors related to prescriber, patient, product and other professionals are discussed briefly as to how they influence the prescribing practice. The successful implementation of prescribing by nurse practitioners depends largely upon their knowledge about these factors. Identifying strategies to minimize potential negative influences can enhance the implementation and effectiveness of the prescribing practice by nurse practitioners.

Reading assignments

1. Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk

PART V: Process of prescribing

The national formulary of India 2016 is a published updated document available in India. The formulary provides general advice to prescribers in India. The process and steps of prescribing are discussed in the WHO guide to good prescribing (1994) and this is followed by India that is reflected in the formulary.

Process of rational prescribing

This involves selection of a drug treatment using the stepwise approach that includes the following.

1. Define the patients problem carefully (diagnosis)
2. Specify the therapeutic objective
3. Choose a treatment of proven efficiency and safety from different alternatives (refer national formulary of Indian, WHO List of essential drugs)
4. Start the treatment by writing an accurate prescription
5. Providing the patient with clear information and instructions
6. Monitor the results of the treatment
7. Stop the treatment if the problem has been solved.
8. If not re-examine all the steps.

Step 1. Define the patients problem Step

2. Specify the therapeutic objective Step

3. Select the therapeutic strategies

Step 4. Start the treatment and write the prescription

Step 5. Give information, instructions and warnings Step

6. Monitor the treatment

Box 1. The process of rational treatment

Step 1. Define the patient's problem

When defining the patient's problem, the knowledge of health assessment must be revised and skills are utilized. Whenever possible, making the right diagnosis is based on integrating many pieces of information such as the complaint as described by the patient, a detailed history, physical examination, laboratory tests, X-rays and other investigations. This helps in rational prescribing.

Step 2. Specify the therapeutic objective

After examining the holistic needs of the patient ask the following questions. Is the

diagnosis established?

Is information or advice sufficient? Is

there a need to prescribe?

What does the patient expect?

What is your objective for treating the patient? Define what you want to achieve from the drug. (e.g.) to suppress chronic dry cough to prevent heart attack in angina

The therapeutic objectives should be based on the pathophysiology underlying the clinical condition. More than one objective may be selected sometimes.

Step 3. Select the therapeutic strategies

Making a choice involves the following consideration

- Appropriate
- Effective
- Safe
- Cost
- Acceptable

Refer the following:

1. Nurse prescriber's formulary
2. National Formulary of India and national list of essential medicines
3. WHO list of essential drugs
4. Other relevant documents
5. Existing standard treatment protocols and guidelines

Select the strategy based on the knowledge of pathophysiology and the findings from history, examination, lab tests and other investigations. Medication or drug history and allergies are vital in the history that includes the following

- List of medications the patient is on with the repeat prescription of the medication
- Record from the history the name, dose, frequency and route of medication
- Prescribed or not
- Enquiry about OTC drugs (over the counter) or any other herbal preparations
- Any allergies reaction to medication, foods or environment factors and treatment given
- Recording of the above

History related to age, sex, hereditary factors, lifestyle factors, social and community networks living and working conditions, socio economic cultural and environmental conditions.

The selected strategy should be agreed with the patient that is known as concordance.

Non-pharmacological treatment:

Not all patients require a medicine for the treatment. Very often many health problems can be resolved by a change in lifestyle, diet, use of physiotherapy or exercise, and providing psychological support. These have the same effect as a drug and instructions must be written, explained and monitored in the same way.

Pharmacological treatment:

This involves selecting the correct group of drugs, selecting the medicine from the chosen group, and verifying the suitability of the chosen drug for each patient.

Knowledge about the pathophysiology of the clinical condition, pharmacokinetics and pharmacodynamics of the chosen drug are fundamental principles for rational therapeutics.

The selection process must consider the efficacy and safety of the drug.

For safety, the potential benefits of the treatment must always be balanced against known safety concerns. How to avoid adverse drug reaction?

1. Use as few concurrent drugs as possible.

2. Use the lowest effective dose.
3. Check if patient is pregnant or breast feeding
4. Is the patient at extremes of life?
5. Do you know all the drugs that the patient is taking
6. Check for over the counter medicines
7. Drug allergies or previous reaction to medications

Make an inventory of effective groups of drugs. Once you have compared various treatment alternatives and considered the four criteria such as efficacy, safety, suitability and cost, choose the drug.

In selection of the drug, choose an active substance and a dosage form, choose a standard dosage schedule, and choose a standard duration of treatment

Advice to be given to patient first with an explanation of why it is important, use words that patient can understand and be brief.

Step 4. Start the treatment

Prescribe the (treatment) drugs

Writing a prescription

A Prescription is an instruction from a prescriber to a pharmacist/dispenser. Prescriber is not always a doctor, it could be a nurse, medical assistant etc. The dispenser is not always the pharmacist it could be an assistant nurse. Every country has its own standards, laws and regulations as to who should prescribe, dispense and the required information in a prescription form, drugs that require prescription or not, special laws regarding narcotics etc.

Information on a prescription

Based on individual country's regulations. Legibility

Clarity (Legal obligation

Precision _

Information

- Name & address of the prescriber with telephone no (if possible)
- Date of prescription
- Name (Generic Name) and strength of drug
- Dosage form (only use standard abbreviations) Tab paracetamol 500 mg (10 tablets) BDx5 days.
- Label: how much, how often, special instruction,
- Name, address, age of patient.
- Prescriber's initials signature, License no.

Step 5. Give Information, Instruction and warnings

50% of patients do not take prescribed drugs correctly take irregularly or not at all. The most common reasons are that the symptoms have stopped, side effects have occurred, or the drug is not perceived as effective, or the dosage schedule is complex to understand. Giving information, instruction and warnings is important to ensure patient compliance/adherence

Adherence to drug treatment can be improved if

- Drug is well chosen and prescribed
- A Good prescriber patient relationship is created

- Time is taken to give necessary information, instructions and warnings.

How to improve patient adherence to drug treatment

- Prescribe a well-chosen treatment
- Create a good doctor-patient relationship
- Take the time to give information, instruction and warnings

Other aids to improve adherence could be patient leaflets, pictorials, day calendar, drug passport and dosage box.

Information to include:

- Effects of the drug
- Side effects
- Instructions
- Warnings
- Future consultation
- Confirmation of understanding

Step 6. Monitor the treatment (Stop or continue)

Monitoring enables you to determine whether the treatment has been successful or additional action is required. This allows stopping or reformulating if necessary or continuation of treatment.

Passive monitoring (self-monitoring)

Active monitoring (Future appointment & consultation)

s the treatment effective?

a. Yes, and disease cured/stop the treatment
b. Yes, but not yet completed - Any serious side effects
   - No: treatment can be continued
   - Yes: Reconsider dosage or drug choice
c. No, disease not cured - verify all steps:
   - Diagnosis correct
   - Therapeutic objective correct?
   - Drug prescribed correctly?
   - Effect monitored correctly?

Keep up to date about drugs

Knowledge is constantly changing. New drugs come to the market. Every prescriber is expected to know about the side effects and also developments in drug therapy.

Choosing sources of information

1. Make an inventory of available sources of information.
   - Reference books & Medical journals
   - Drug compendia - hand books for desk reference national formulary
   - National lists of essential drugs and treatment guidelines
   - Drug formularies
   - Drug bulletins, drug information centers
   - Verbal information
   - Drug industry sources of information
2. Choose between sources of information credible and accessible.

E.g. Medical journals, drug bulletins, pharmacology or clinical reference books, national formulary revisions

3. Effective reading- Read useful resources, clinical trials.

It is important to develop a strategy to maximize your access to key information you need for optimal benefit of the drugs you prescribe.

Assignments/Learning Activities - Case study discussion

Learning different steps of prescribing from case studies

Refer - The guide to good prescribing - Practice Manual, WHO, Geneva, 1994

PART VI: Prescribing Competencies

Every practitioner who prescribes must possess various competencies required by respective regulatory bodies. The prescribing competency framework recommended by NPC consists of three domains:

National Prescribing Centre (NPC, NICE -UK), 2014

1. The consultation
2. Prescribing efficiency
3. Prescribing in context

I Domain - The consultation Competencies

1. Knowledge

Has up-to-date clinical, pharmacological and pharmaceutical knowledge relevant to own area of practice.

2. Options

Makes or reviews a diagnosis, generates management options for the patient and follows up management.

3. **Shared Decision Making** (with parents, care-givers or advocates where appropriate)

Establishes a relationship based on trust and mutual respect. Recognizes patients in the consultation.

II Domain - Prescribing Effectively Competencies

4. Safe

Is aware of own limitation. Does not compromise patient safely.

5. Professional

Ensures prescribing practice is consistent with scope of practice, organizational, professional and regulatory standards, guidance and codes of conduct.

6. Always improving

Actively participates in the review and development of prescribing practice to optimize patient outcomes.

III Doman - Prescribing in context Competencies

7. The health care system

Understands and works within local and national policies, process and systems that impact on prescribing practice. Sees how own prescribing impacts on the wider healthcare community.

8. Information

Knows how to access relevant information. Can use and apply information in practice.

9. Self and others

Works in partnership with colleagues for the benefit of patients, is self-aware and confident in own ability as a prescriber.

Royal Pharmaceutical Society's (UK) Prescribing Competency Framework- Comprises of ten competencies within two domains.

THE CONSULTATION

1. Assess the patient
2. Consider the options
3. Reach a shared decision
4. Prescribe
5. Provide information
6. Monitor and review

PRESCRIBING GOVERNANCE

7. Prescribe safely
8. Prescribe professionally
9. Improve prescribing practice
10. Prescribe as part of a team

Reading assignments:

1. A Single Competency Framework for all prescribers NPC (National Prescribing Centre) (Provided by NICE), 2012
2. Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)

PART VII: Conclusion

Nurse prescribing is not a practice in India. With the introduction of Nurse practitioner program in Critical Care and midwifery, the need for granting prescriptive rights to NPs is being recognized. Legal provision for NPs to be involved in prescribing is being explored and INC is working towards developing regulations and legal provision along with MOH&FW. It is hoped that this will become a reality soon similar to the practice in UK, USA and Australia.

This learning and teaching module on Fundamentals of Prescribing is divided into 5 parts and can be offered to orient the students in prescribing practice, its principles and legislation required and the needed competencies for prescribers. Both theory and practical are planned with the assessment plan for the course module. This module will enhance the understanding of BSc nursing students on prescribing principles and assist them to develop the prescribing competency when called to use it as community health officer in Health and wellness centres/primary care settings.

References:

- Nuttal, D & Rutt- Howard, J (editors) (2011). The Text Book of Non- Medical Prescribing
- Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)
- Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk
- A Single Competency Framework for all prescribers, National Prescribing Centre-NPC (Provided by NICE), 2012, NPC is part of NICE (National Institute for Health and Clinical Excellence, NICE) Ref. NICE (2012) A Single Competency Framework for all Prescribers NPC.
- Non- Medical Prescribing Policy, surrey with Sussex (NHS) NMPSS- prescribing principles, 2004
- National Formulary of India, 2016
- Drug & Cosmetics Act, 1940 & 1945
- The guide to good prescribing, WHO, Geneva, 1994

(NB: Latest edition must be consulted as and when revised)

PALLIATIVE CARE MODULE (Adult Health Nursing II)

PLACEMENT: IV SEMESTER

Theory & Practical: 20 hours

Theory: 15 hours

Practical: 5 hours

Module Overview: This module is designed to help students to develop in-depth knowledge, competencies, and a positive approach in providing quality palliative care to persons suffering from chronic illnesses and resultant health problems in variety of settings, collaborating supportive services.

Competencies (Learning Outcomes): The student will be able to

1. Explain the concept and significance of palliative care.
2. Identify the need for palliative care.
3. Discuss the importance and techniques of effective communication in palliative care
4. Demonstrate skill in assessment, management and evaluation of pain and common symptoms
5. Provide optimum nursing care to relieve symptoms and promote comfort.
6. Demonstrate competency in performing nursing procedures related to palliative care
7. Assist the patient to experience maximum Quality of Life.
8. Support patient and family for home care and to cope with the terminal phase of illness
9. Observe ethical and legal principles binding palliative care.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Health assessment & Symptom management competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept significance of palliative care. Identify the need for palliative care. .	**Palliative Care** • Evolution, and History • Concept of palliative care • Significance • Components • Differences between conventional and palliative care approaches • Ethical aspects • Need for palliative care	• Lecture cum discussion	• MCQ • Short answers

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
II	2	Discuss different aspects of effective communication. Describe how to deal with extremes of emotions	**Communication Skills** • Effective communication - needs and barriers • Non-verbal communication • Learning to communicate patients with advanced and progressive diseases • Communicating bad news • Managing collusion • Managing anger and denial	• Review • Discussion • Simulation • Case Scenario	• MCQ • Short answers • Role play
III	8 (T) 2 (P)	Demonstrate skill in assessment, management and evaluation of pain and other common symptoms Apply non-pharmacological and pharmacological Nursing interventions for pain relief. Render optimum nursing care to relieve symptoms and to promote comfort. Prepare the patient and caregiver for continued care.	**Nursing Management of Symptoms** • Holistic approach in symptom assessment and management, • Pain - concept, assessment and evaluation of pain, patho-physiology of chronic pain, • WHO ladder for pain management, Morphine – steps in calculating dose for oral morphine, management of opioid overdose and side effects, • Nursing interventions for management of pain • Management of dyspnoea, Nausea and vomiting, Constipation, Diarrhoea • Nutrition and Hydration • Fatigue and Powerlessness • Anxiety, Social isolation • Spiritual distress • Impaired physical mobility • Self-care deficit • Delirium • Caregiver role strain	• Review • Discussions • Demonstration	• Case study • Written assignment • Essay
IV	1 (T) 3 (P)	Demonstrate competency in performing nursing procedures related to palliative care.	**Nursing Procedures** • Wound care • Colostomy care • Subcutaneous injection • Oral hygiene • Naso-gastric tube management • Tracheotomy care • Assisting in thoracocentesis • Assisting in indwelling ascitic catheter placement • Lymphoedema management • Bladder care	• Review and discussions • Simulation	• OSCE

V	2 (T)	Discuss measures to improve Quality of Life. Explain care in the terminal phase, loss and grieving process. Observe ethical and legal principles applied to palliative care.	**Optimization of care** • Quality of Life • Essential care • Anticipatory prescription • Dying with dignity • Care during the terminal phase • Ethics based decision making • Death and dying, end of life Support to the care giver and family	• Review and discussion • Case scenario • Observation visit to a palliative care facility	• Short answers • Observation Visit Report

References:

- Rajagopal, M. R. (2015). An Indian Primer of Palliative care for medical students and doctors. Kerala: Trivandrum Institute of palliative science publication.
- Palliative care module prepared by WHO CC of Trivandrum and Calicut (Latest version to be used as and when available)

FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC),

PLS AND IMNCI MODULES (Child Health Nursing I)

FBNBC & ENBC: Can be offered as a single module

S.No.	HOURS	MODULE NUMBER & TITLE			
		I. FBNBC & ENBC	II. IMNCI	III. PLS	TOTAL
1	Theory Hours	10	10	3	**23**
2	Lab Hours	8	5	4	**17**
3	Clinical Hours	25	25	10	**60**
	Total	**43**	**40**	**17**	**100**

FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) (Child Health Nursing)

PLACEMENT: V SEMESTER

THEORY & SKILL LAB: 18 hours

Theory: 10 Hours

Skill Lab: 8 hours

MODULE OVERVIEW: This course is designed to help students to demonstrate the cognitive and psychomotor skills necessary for ensuring healthy survival of neonates.

COMPETENCIES (Learning outcomes): The student will be able to

1. Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby
2. Enlist the factors which contribute to heat loss in newborn
3. Demonstrate methods to keep the baby warm after birth and at home
4. Discuss Kangaroo mother care and develop skill in assisting for Kangaroo Mother Care
5. Recognize different methods to feed normal and low birth weight babies
6. Demonstrate skill in assisting the mother for breastfeeding the newborn baby
7. Identify and manage at-risk and sick neonates
8. Perform resuscitation of newborn baby and provide aftercare
9. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications
10. Enumerate key points in prevention of infection in hospitals and waste disposal

CONTENT OUTLINE

T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
1	1 (T) 1 (L)	Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby	**Evidence based care of newborn** • Basic needs of a normal baby at birth • Immediate care of the normal newborn at the time of birth • Monitoring the baby in the first hour after birth	• Lecture • Discussion	• Questioning • Tests

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Care of the baby in special situations • Postnatal care of normal baby		
2	1 T) 1(L)	Enlist the factors which contribute to heat loss in newborn Demonstrate methods to keep the baby warm after birth and at home	**Temperature regulation in newborn** • Handicaps of newborn in temperature regulation • Warm chain • Assessment of temperature and management of hypothermia • Hyperthermia	• Discussion • Demonstration	• OSCE
3	1 (T) 1 (L)	Discuss Kangaroo mother care and develop skill in assisting for Kangaroo Mother Care	**Kangaroo mother care** • KMC - Components and benefits • Requirements and eligibility • Procedure	• Discussion	• OSCE
4	1 (T) 1 (L)	Recognize different methods to feed normal and low birth weight babies Demonstrate skill in assisting the mother for breastfeeding the newborn baby	**Feeding the newborn** • Breast feeding • Feeding of low birth weight and sick newborns	• Discussion • Demonstration	• Tests • Questioning • OSCE
5	2 (T) 1 (L)	Identify and manage at-risk and sick neonates	**Care of sick neonates** • Care of at-risk neonates • Care of sick neonates	• Discussion • Demonstration	• Tests • Questioning
6	1 (T) 2 (L)	Perform resuscitation of newborn baby and provide aftercare	**Newborn Resuscitation** • Preparation for resuscitation • Assessing the need for resuscitation • Steps of resuscitation • Follow up care after successful resuscitation	• Demonstration and return demonstration	• Questioning • OSCE
7	2 (T) 1 (L)	Demonstrate skill in using and maintaining neonatal equipments, doing common procedures, preparing Common medications and emergency triaging	**Common nursing procedures** • Use and maintenance of neonatal equipments • Common procedures done in newborn • Preparation of common medications • Emergency triage assessment and treatment	• Discussion • Demonstration	• Tests • Questioning • OSCE
8	1 (T)	Enumerate key points in prevention of infection in hospitals and waste disposal	**fection prevention and control** • Principles of asepsis and universal precautions • Handwashing		• Tests • Questioning • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Skin preparation for venipuncture and other procedures • Surveillance • Safe disposal of hospital waste		

CLINICAL: 25 hours

Clinical Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate immediate care of a newborn at the time of birth
2. Demonstrate methods to keep the baby warm after birth and at home
3. Encourage Kangaroo mother care
4. Recognize and practice different methods to feed normal and low birth weight babies
5. Identify and manage at-risk and sick neonates
6. Perform resuscitation of newborn baby and provide aftercare
7. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications
8. Practice key points in prevention of infection in hospitals and waste disposal

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

IMNCI MODULE (Child Health Nursing I)

PLACEMENT: IV SEMESTER

THEORY: 10 hours

SKILL LAB: 5 hours

CLINICAL: 25 hours

DESCRIPTION: This course is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment, nursing care of infants and children with various diseases using guidelines as per IMNCI in the hospital and home settings.

COMPETENCIES (Learning outcomes): The student will be able to

1. Trace the history and developments in the field of integrated management of child health and child health nursing
2. Apply the concepts of IMNCI in providing care to the pediatric clients and their families
3. Identify effective management of young infants up to 2 months
4. Demonstrate skill in case management of young infants up to 2 months
5. Recognize effective management of children age 2 months to 5 years
6. Demonstrate skill in case management of children age 2 months to 5 years
7. Demonstrate skill in treatment procedures and referral of sick children
8. Demonstrate skill in counseling of the care takers

CONTENT OUTLINE

T - Theory, L - Lab/Skill Lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Trace the history and developments in the field of integrated management of child health and child health nursing	**IMNCI - Introduction** • Background and Objectives • Components and principles • Rationale for an integrated evidence based syndromic approach to case management	• Lecture • Discussion	• Written assignment • Tests
2	2 (T) 1 (L)	Apply the concepts of IMNCI in providing care to the pediatric clients and their families	**Steps of case management process** • Assess the young infant/child • Classify the illness • Identify treatment • Treat the young infant/ child • Counsel the mother • Provide follow up care	• Discussion • Demonstration	• OSCE
3	2 (T) 1 (L)	Identify effective management of young infants up to 2 months Demonstrate skill in case management of young infants up to 2 months	**Assessment of sick young infants** • History taking • Checking for possible bacterial infection/ jaundice • Diarrhea • Feeding problem/ malnutrition • Immunization status • Other problems	• Discussion • Demonstration	• OSCE

4	2 (T) 1 (L)	Recognize effective management of children age 2 months to 5 years Demonstrate skill in case management of children age 2 months to 5 years	**Assessment of sick children** • History taking • Checking for general danger signs • Checking main symptoms • Checking for malnutrition • Checking for anaemia • Assessment of feeding • Checking immunization Assessing other problems	• Discussion • Demonstration	• OSCE
5	2 (L)	Demonstrate skill in treatment procedures and referral of sick children referral of children	**Treatment procedures** • Identify treatment • Inpatient and outpatient treatment • Home management • Referral	• Discussion • Demonstration	• OSCE
6	2 (T)	Demonstrate skill in counseling of parents and care takers	**Parental counseling** • Advice regarding feeding and fluid intake, and solving of feeding problems • Administration of oral drugs • Advise when to return	• Discussion • Role play	• OSCE

Clinical: 25 hours

Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate skill in case management of young infants up to 2 months
2. Demonstrate skill in case management of children age 2 months to 5 years
3. Demonstrate skill in treatment procedures and referral of sick children
4. Demonstrate skill in counseling of the care takers and follow up care

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

PLS MODULE (Child Health Nursing I)

PLACEMENT: V SEMESTER

Theory: 3 hours

Skill Lab: 4 Hours

Clinical: 10 Hours

COMPETENCIES (Learning outcomes): The student will be able to

1. Recognize early signs of critical illness in children
2. Identify early signs of cardiopulmonary arrest
3. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
4. Differentiate between respiratory distress and failure
5. Intervene respiratory distress and failure at the earliest
6. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
7. Demonstrate skill in CPR
8. Provide Post-cardiac arrest management

CONTENT OUTLINE

T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Recognize early signs of critical illness in children Identify early signs of cardiopulmonary arrest	**Identification of critical illness in children** • Early signs of critical illness in children • Early signs of cardiopulmonary arrest • Assessment of appearance based on AVPU scale	• Lecture • Discussion	• Questioning • Tests
2	1 (T)	Differentiate between respiratory distress and failure	• Respiratory distress • Respiratory failure	• Discussion	• OSCE
3	1 (L)	Intervene respiratory distress and failure at the earliest	• **Prompt Interventions for** Respiratory distress and Respiratory failure	• Discussion • Demonstration	• OSCE
4	1 (L)	State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system	**Medications used in cardiopulmonary arrest** • Indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system	• Discussion • Demonstration	• OSCE

5	1 (L)	Demonstrate skill in CPR	**CPR** • Steps in carrying out Child CPR	• Demonstration and return demonstration	• OSCE
6	1 (L)	Provide Post-cardiac arrest management	**Post-cardiac arrest management**	• Discussion • Demonstration	• OSCE

Clinical Practice Competencies: 10 hours

On completion of the course, the students will be able to:

1. Recognize early signs of critical illness in children
2. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
3. Differentiate between respiratory distress and failure
4. Intervene respiratory distress and failure at the earliest
5. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
6. Demonstrate skill in CPR
7. Provide Post-cardiac arrest management

LEARNING ACTIVITIES: Specified in the above table.

ASSESSMENT METHODS:

- Test paper (Objective type/short answers) - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources: (Latest version must be consulted as and when revised)

1. National guidelines - MOH&FW
2. AHA guidelines

SBA MODULE & SAFE DELIVERY APP MODULE

(Midwifery/Obstetrics & Gynecology Nursing I&II)

PLACEMENT: VI & VII SEMESTER

Theory, skill lab and clinical hours are integrated in MIDWIFERY/OBS & GYNEC I & II Courses.

Module Overview:

SBA module is prepared by MOH&FW, GoI and can be used in MIDWIFERY/OBS & GYNEC I & II Courses.

Safe delivery app is available in INC website prepared by Maternity Foundation of India and INC

Competencies (Learning Outcomes): The student will be able to

1. Demonstrate knowledge and competencies to provide respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings.
2. Provide safe and competent care to normal neonate and neonate with complications.
3. Identify complications in women during antenatal, intranatal, and postnatal periods.

Learning Activities:

- Lectures and Demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

SBA module

- Test paper - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Safe Delivery App

Completion of Safe delivery app as champion.

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources:

1. **SBA-A handbook for ANM, LHV & Staff nurses (2010),** MoH&FW document
2. Dakshata (2015) national guidelines
3. **SAFE DELIVERY APP**

(Maternity foundation of India and INC)

NB.

- Completion of both Modules is mandatory before the end of VII Semester.
- Latest Versions of National Guidelines must be consulted.

APPENDIX 02

LIST OF ELECTIVE MODULES

III & IV Semesters: *To complete any **one** elective by end of 4th semester across 1st to 4th semesters*

1. Human values
2. Diabetes care
3. Soft skills

V & VI Semesters: *To complete any **one** of the following before end of 6th semester*

4. CBT
5. Personality development
6. Addiction psychiatry
7. Adolescent health
8. Sports health
9. Accreditation and practice standards
10. Developmental psychology
11. Menopausal health
12. Health Economics

VII & VIII Semesters: *To complete any **one** of the following before end of 8th semester*

13. Scientific writing skills
14. Lactation management
15. Sexuality & Health
16. Stress management
17. Job readiness and employability in health care setting

Number of electives to be completed: 3 (Every module = 1 credit = 20 hours)

HUMAN VALUES

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge and attitude towards inculcating human values.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Understand the concept and importance of human values.
2. Analyze the impact of human values in family, society and profession.
3. Apply human values in education and clinical practice.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Explain the concept of human values, nature and types	**Introduction** • Introduction to human values - Definition and nature of human values • Types of human values - Different categorization • Instrumental and extrinsic values • Personal and professional values • Examples of human values - cooperation, honesty, caring, compassion, love, respect, sharing, loyalty, appreciation, integrity, discipline, justice, solidarity, civility, non-violence	• Lecture cum discussion • Discuss some of the human values having universal relevance • Value clarification exercise • Role play	• Quiz
II	4	Understand the significance of human values and in nursing Identify the difference between human, ethical and moral vales	**Importance of human values** • Need and importance of human values • Functions of values • Reflection on individual values • Human values, ethical values and moral values - differences and similarities	• Reflective exercises and report • Sharing in groups • Discuss lessons from the lives and teachings of great leaders, reformers and administrators	• Evaluation of reflective report/group work report
III	2	Explore the role of human values in family and society	**Role of human values in family and society** • Family values • Social standards • Influence of family and society	• Lecture cum discussion	• Short answers
IV	4	Discuss the role of educational institutions in inculcating human values	**Role of education and human values** • Teachers as role model • Development of accountability, appreciation and helping nature • Discipline as a human value • Value education strategies	• Lecture cum discussion • Case scenario and discussion	• MCQ • Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
V	4	Explain the core values at workplace and apply in clinical settings	**Professional Values** • Professional values - examples • Professional values and Value development in nursing • Core values at workplace, application in clinical settings and implications	• Case scenario and discussion • Application in clinical practice - Refection	• Evaluation of assignment
VI	2	Explain the influence of culture on values	**Values and cross-cultural influence** • Cultural values • Universal application • Universal declaration of human values and human rights	• Lecture cum discussion • Case scenario and discussion	• Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

DIABETES CARE

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge, skill and attitude regarding Diabetes and care.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Understand the concept of NCDs and relevant national programs.
2. Review the pathophysiology and clinical diagnostic criteria for diabetes.
3. Analyze the diabetes treatment options such as medication, diet, exercise and life style modifications.
4. Apply the principles and demonstrate self-management skills to achieve diabetes control .
5. Identify onset of complications and provide means of seeking appropriate and timely help.
6. Demonstrate understanding of recent updates in diabetes.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept of NCDs and national NCD programs	**Introduction** • Introduction to Diabetes as Non communicable disease burden - global & national - Review • Diabetes risk factors, preventive measures & risk reduction measures • Role of nurse in national programs relevant to Diabetes prevention, control and care	• Lecture cum discussion • Directed reading and assignments	• Quiz
II	4	Recall and discuss the pathophysiology of Diabetes, its clinical characteristics and diagnostic criteria	**Pathophysiology and diagnosis of Diabetes** • Review - structure & functions involved in key organs relating to diabetes (pancreas, liver, muscle, adipose tissue & kidney) • Relationship between blood glucose and insulin • Prediabetes condition • Types of Diabetes - Type I & II • Screening • Symptoms • Diagnostic Criteria	• Review • Case scenario and discussion • Sharing in groups	• Evaluation of group work report
III	4	Discuss the available treatment options	**Diabetes treatment options** • ***Life style modifications*** • ***Diet therapy*** • ***Exercise*** • ***Medical therapy*** oOral antidiabetic agents used to treat diabetes otypes, actions, side effects and contraindications	• Drug study • Written assignments	• Quiz • Test paper • Evaluation of written assignments

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			○ Combination treatment regimen ○ Medication considerations in elderly ○ Insulin therapy - Types, regimen, preparation and administration ○ Recent advances in medication therapy		
IV	3	Identify complications and provide timely support in management of complications	**Complications of diabetes** ***Diagnosis and management of*** • Hypoglycemia • Hyperglycemia • Diabetic ketoacidosis • Macrovascular complications • Diabetic retinopathy • Diabetic nephropathy • Neuropathy • Gestational diabetes in pregnancy	• Lecture cum discussion • Case study	• Short answers • Essay • Case study reports
V	5	Identify the challenges of living with diabetes Achieve effective self-management skills	**Self-Management** • Challenges of living with diabetes • Role of self-care in diabetes management • Effective self-management skills to attain and maintain diabetes control • Monitoring blood glucose levels -methods to monitor diabetes control and analysis of blood glucose patterns ***Nutrition therapy*** • Nutritional needs of patients with diabetes • Nutritional assessment • Determination of body mass index (BMI), waist-to-hip ratio • Meal planning methods • Problems associated with diet therapy ***Physical activity*** • Role of exercise in diabetes management • Components of exercise prescription • Exercise needs assessment • Types of exercises • Benefits of yoga for people with diabetes • Strategies to prevent hypoglycemia during or after exercise ***Medication therapy***	• Lecture cum discussion • Demonstration • Practice • Meal planning • Role play	• Short answers • OSCE • Assessment of meal plan

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Understanding action, side effects and contraindications • Insulin therapy - preparation and administration • Role of diabetes educator in education and counseling **Complication identification and seeking appropriate help**		
VI	2	Update the knowledge on diabetes, its management and care Discuss the role of diabetes educator Identify the role of complementary therapies	**Recent updates in diabetes** • Oral health and diabetes • Managing diabetes during disasters • Recent update on treatment and care modalities • Role of diabetes educator in diabetes care, education, counseling and management • Complementary therapies	• Lecture cum discussion • Directed reading	• MCQ • Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Meal planning) - 10 marks

LEARNING RESOURCES:

- Facilitator manual for training nursing staff on **"Prevention and Management of Non-Communicable Diseases"** developed by People to People Health Foundation (PPHF), 2019

SOFT SKILLS

PLACEMENT: III & IV SEMESTER

TOTAL HOURS: 1 Credit (20 hours)

DSECRIPTION: This module is designed to improve the soft skills of the students and covers important skills required for personal and professional lives such as etiquette, presentation, time management, motivation, decision making and team work.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Identify & perform personal, professional & Social Etiquette
2. Illustrate Telephone Etiquette
3. Learn & apply Presentation skills.
4. Be empowered in Public Speaking
5. Practice appropriate time management and use planning tools
6. Incorporate Motivational skills in practice
7. Develop Decision making skills
8. Demonstrate Teamwork in workplace

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Identify & perform personal, professional & Social Etiquette	**Personal Etiquette:** • Grooming and personal hygiene • Body language-Postures & facial expressions • Punctuality and respectfulness • Manners **Professional Etiquette:** • Meeting etiquette • Workplace etiquette • communication etiquette-Oral & written **Social Etiquette:** • What is Social Etiquette? • Why are social skills important? • Types of social skills • Conversational skills - Greetings, listening, interacting • Common courtesies - Thank you, No thank you, Excuse me, May I • Social skill defects **Other types:** • Classroom etiquette-respectful and punctual, use of cell phone, engagement in the class • Virtual classroom etiquette • Social media etiquette	• Demonstration return demonstration	• Feedback from faculty and co-students

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
II	2	Illustrate Telephone Etiquette	**Telephone etiquette:** • Introduce yourself first • Clarity of speech • Active listening and take notes • Use appropriate language • Remain cheerful	• Demonstration return Demonstration	• Anonymous Assessment
III	3	Learn & apply Presentation skills.	**Presentation Skills:** • Introduction • Types of Presentation Skills • Structure • Importance of Presentation skills • Making a Presentation • Delivering a Presentation	• Lecture with discussion	• Sample presentations
IV	2	Empowered in Public Speaking	**Public Speaking:** • Elements of Public Speaking • Types of Public Speaking • How do you begin a speech • How do you make your speech good • Factors of Public Speaking	• Lecture & Demonstration return Demonstration	• Health talk
V	2	Practice appropriate time management and use planning tools	**Time management:** • Know how to spend time • Set priorities • Using a Planning Tool • Getting Organised/Schedule time appropriately	• Roleplay	• Adherence to Timeline
VI	2	Incorporate Motivational skills in practice	**Motivational skills:** • Forming and Changing Habit • Gratitude • Positivity • Mindfulness	• Lecture with discussion	• 360 degree Feedback
VII	2	Develop Decision making skills	**Decision making skills:** • What is Decision making skills • The 5 Decision making skills • Styles of Decision making • How to develop decision making	• Role play	• Critical thinking Competencies
VIII	2	Demonstrate Teamwork in workplace	**Team work:** • Differentiate team/teamwork • Examples of team work skills • Working with different teams • Build a team in your workplace environment	• Lecture with discussion	• Feedback from colleagues

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Time management/presentation/etiquette) - 10 marks

COGNITIVE BEHAVIOURAL THERAPY (CBT)

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire comprehensive knowledge regarding the basics of Cognitive Behavioural Therapy and develop an insight into behaviour of self and others. Further it is aimed at helping them to practice the principles of CBT for promoting Mental Health in Nursing Practice.

LEARNING OUTCOMES:

On completion of the module, the student will be able to:

1. Explain the concept and techniques of CBT
2. Use techniques to develop a therapeutic alliance based on CBT
3. Discuss cognitive conceptualization-automatic thoughts and alternative explanations based on cognitive model
4. Describe strategies to identify and respond to cognitions including dysfunctional cognitions
5. Formulate thought records and action plans

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6	Explain the concept and techniques of CBT Use techniques to develop a therapeutic alliance based on CBT	**Concepts and Techniques of CBT** • Concept - Definition • Techniques and applications of CBT • Factors influencing effective delivery of CBT • CBT Model • The therapeutic relationship and setting goals with clients	• Lecture and Discussion • Role play • Demonstration	• **Skills check:** Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals
II	4	Discuss cognitive conceptualization - automatic thoughts and alternative explanations based on cognitive model	**The Cognitive Model** • Three levels of thoughts • Automatic thoughts - development and tracking • Designing and implementing experiments to test automatic thoughts • Biofeedback in CBT	• Lecture cum discussion • Assignment on automatic thoughts and its testing	• Evaluation of assignment
III	5	Describe strategies to identify and respond to cognitions including dysfunctional cognitions	**Identifying, Evaluating and Responding to Cognitions** • **Socratic questioning -** Technique of questioning • **Behaviour experiments -** Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc.	• Lecture cum discussion • Role play • Assignment on identifying and responding to dysfunctional cognitions	• Evaluation of assignment
IV	5	Formulate thought records and action plans	**Designing Effective Action Plans and Thought Records** • Thought records components • Action plan components • Identifying underlying and new core beliefs and assumptions • Facilitating completion of the action plan and reviewing the action plan at the next session	• Lecture cum discussion • Role play	• **Skills check:** Formulate thought records and action plans and prepare worksheets

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Establishment of therapeutic relationship with client on CBT/Formulating thought records or action plans) - 10 marks

LEARNING RESOURCES:

1. Greenberger D, Padesky CA. Mind over Mood: Change How You Feel By Changing the Way You Think. The Guilford Press; 2016
2. Beck JS, Beck AT. Cognitive Therapy: Basics and Beyond. Guilford Publications; 2011

Websites: http://focus.psychiatryonline.org/cgi/content/full/4/2/173
http://www.learncognitivetherapy.com/cognitive_therapy.htm

NB:

- Brief notes on the content is attached below.

CORSE CONTENT (Brief notes below)

UNIT I (6 Hours): CONCEPTS AND TECHNIQUES OF CBT

Concept: CBT is based on the concept that mental disorders are associated with characteristic alterations in cognitive and behavioral functioning and that this pathology can be modified with pragmatic problem-focused techniques, interaction of thoughts, feelings and behaviour.

Techniques and Applications of CBT

CBT is a cognitive technique and behavioural technique.

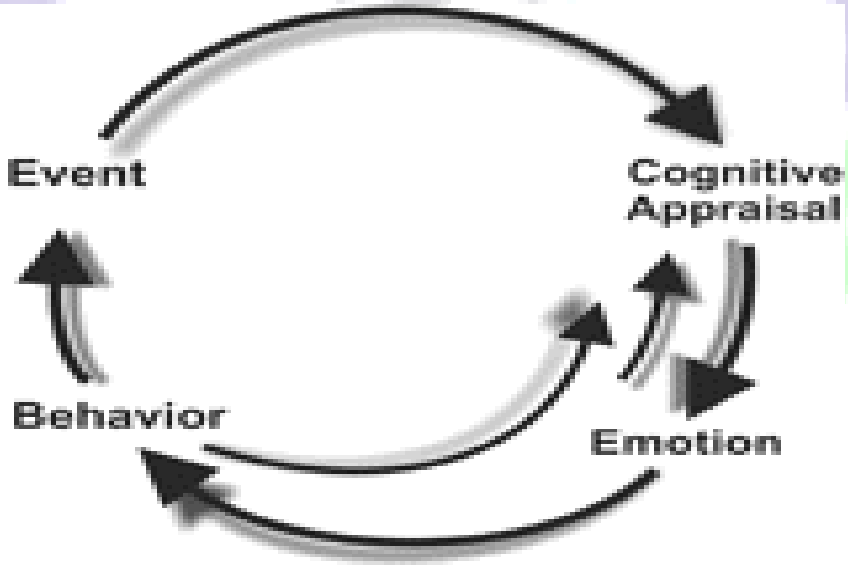
Application – wide applications: Psychiatric (Depression, Anxiety etc.) and non-psychiatric (sleep, fatigue, pain etc.)

Factors influencing effective delivery of CBT

Collaboration, formulation, homework etc.

The CBT model

Basic Cognitive Behaviour Model



Source: From Wright JH, Basco MR, Thase ME: Learning Cognitive-Behavior Therapy: An Illustrated Guide. Washington, DC, American Psychiatric Publishing, 2006, p 5.

The therapeutic relationship and setting goals with clients

- Assessment, person education, goal setting, practice of strategies, homework
- Collaborative therapy relationship

Skills check: Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals (Role play)

UNIT II (4 Hours): THE COGNITIVE MODEL

Three levels of thoughts: automatic thoughts, underlying assumptions and schemas

Understanding interplay between levels of thought and moods, behaviour, physical functions and practice

Automatic thoughts - development and tracking

- Moment to moment unplanned thoughts
- Explain and clarify identification of automatic thoughts with examples from thought records/worksheets

E.g: questions that include

a. What was going through your mind before you started to feel this way? Any other thoughts? Images?
b. Circle hot thought

Designing and implementing experiments to test automatic thoughts

- Using scale or rating for automatic thoughts

Biofeedback in CBT

- Role and significance of Biofeedback in CBT

Skills Check: Assignment on automatic thoughts and its testing

UNIT III (5 Hours): IDENTIFYING, EVALUATING, AND RESPONDING TO COGNITIONS

- Gathering evidence that supports and do not support the hot thoughts
- Actively search for information that contradicts the hot thoughts
- Writing all evidence for supporting that hot thoughts are not 100% true
- Identifying alternative or balanced thinking

Socratic questioning

- Technique of questioning

Behaviour experiments

Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc.

Skills check: Assignment on identifying and responding to dysfunctional cognitions

UNIT IV (5 Hours): DESIGNING EFFECTIVE ACTION PLANS AND THOUGHT RECORDS

Thought records components: situation, moods, automatic thoughts, evidence that supports hot thought, evidence that does not support hot thoughts, alternative or balanced thoughts, rate moods now

Action plan components: Goal, action plan, time to begin, possible problems, strategies to overcome problems, progress

Identifying a problem in life that a person would like to change and writing an action plan

Identifying underlying and new core beliefs and assumptions

- Identify core beliefs by looking for themes in thought record
- Test by looking for evidence
- Strengthen new core beliefs by recording experiences that are consistent, and rate the confidence

Facilitating completion of the action plan and reviewing the action plan at the next session

- Motivating the clients to complete the plans

Skills check: Assignment on Formulate thought records and action plans

PERSONALITY DEVELOPMENT

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire an in-depth knowledge in factors influencing personality development, theories of personality development, personality traits, and personality disorders and further acquire skill in knowing one's own personality, understand others in their surroundings and bring positive change in life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe how personality develops
2. Define various stages of personality development
3. Describe basic personality traits and personality types
4. Analyze how personality affects career choices
5. Describe methods for changing personality
6. Enumerate personality disorders
7. Demonstrate skills in identifying personality disorders
8. Utilize knowledge in knowing self and others and improve relationship with others
9. Provide care to patients with personality disorders by emphasizing on respecting individual culture and spiritual needs

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods

I	2	Describe how personality develops
		
		Explain factors contributing to personality development
			Introduction to personality development
			• Definitions
			• Components of personality
			• Importance of personality in achieving goals and success in life
			• Factors influencing personality development
			  ○ Biological factors
			  ○ Environmental factors
			• Nature vs Nurture concept in personality development
				• Lecture and Discussion method
				• Guest lecture
					• Test paper
					• Quiz

II	5	Enumerate stages of personality development from infancy to late adulthood
		
		Explain various theories of personality development
			Stages and theories of personality development
			• Development of personality from infancy to late adulthood
			• Theories of personality development
			  ○ Psychoanalytic theory
			  ○ Psychosocial theory
			  ○ Trait and type theories of personality
			  ○ Humanistic approaches to personality
			  ○ Learning theories of personality
				• Lecture and Discussion method	• Test paper

III	3	List various types of personalities	**Assessment of personality** • Types of personalities	• Lecture and Discussion method	• Visit report • Written exam

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		Describe effects of illness on personality change Describe various personality assessments	• Personality changes due to illness • Personality assessment	• Visit to clinical psychology department • Guest lecture	• Case discussion
IV	5	Discuss personality and career success Explain various methods of changing personality traits Explain nursing implications of personality	**Personality and career success** • Role of personality and career success • Methods of changing personality traits o Personal growth and self-efficacy • Personality characteristics required for a nurse • Nursing implications of personality	• Lecture and Discussion method	• Written exam
V	5	Explain various personality disorders	**Personality disorders** • Definition • Types • Signs and symptoms • Medical management • Nursing management • Psycho-social therapies	• Lecture and Discussion method	• Perform assessment of personality disorder patient and write assessment report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

ADDICTION PSYCHIATRY

PLACEMENT: V & VI SEMESTER

THEORY & CLINICAL: 1 Credit (20 hours)

THEORY: 06 hours

CLINICAL: 14 hours

DESCRIPTION: This module is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment and nursing management of individuals with various disorders related to addiction.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the Terminologies such as Substance Use Disorders, addictive behaviours, addiction etc
2. Describe the classification of Psychoactive Substances
3. Describe various etiological factors of substance related disorders
4. Identify the psycho social issues of the individuals with substance use disorders.
5. Identify treatment related adverse effects and emergencies and manage them effectively
6. Demonstrate skill in managing patients with substance use disorders.
7. Apply nursing process in caring for patients with substance related disorders.
8. Utilize available support to rehabilitate needy individuals.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T) 14 (P)	Explain and demonstrate skill in assessment of individuals with substance use disorders Explain and demonstrate skill in management and nursing management of individuals with substance use disorders	**Substance use disorders, assessment and management** • Terminologies: Substance related Disorders, addictive behaviour, intoxication, tolerance, withdrawal etc. • Classification of Psychoactive Substances • Factors associated with substance related disorders • Psychosocial problems associated with substance use • Treatment Modalities for Substance - Related Disorders – Multi-Disciplinary Team Approach • Treatment related adverse effects and emergencies • Introduction to technology addiction and its management • Nursing Management of patients with substance use disorders • Rehabilitaion issues	• Lecture cum discussion • Counseling Techniques • Disease model of addiction - Assignment • 2 day posting/visit to a de-addiction centre	• Perform assessment of individuals in in-patient or out-patient and write assessment report • Assessment of assignment • Performing health education at schools, colleges and other selected working areas - evaluation of education

CLINICAL: 14 hours

Clinical Practice Competencies:

On completion of the module, the student will be able to:

1. Assess individuals with substance use disorders
2. Identify risk factors of an individual and plan measures of management and relapse prevention
3. Inform, teach, and guide patients and their families

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of individuals with substance use disorders/health education) - 10 marks

ADOLESCENT HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 10 hours

LAB: 2 hours

CLINICAL: 8 hours

DESCRIPTION: This module is designed to help students to develop knowledge about developmental changes during adolescence and special psychosocial, reproductive and sexual health issues, needs and challenges of adolescents and competencies required for promoting their development and handling their health issues

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the normal growth and development during adolescence
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promoting the development of life skills among adolescents
4. Identify the developmental needs of adolescents
5. Demonstrate skills in Identifying the developmental and Psychosocial issues and challenges during adolescence
6. Discuss the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
7. Demonstrate skills in communicating with adolescents
8. Develop competency in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents including Adjustment & conduct disorders, mental disorders, eating disorders, substance use disorders
10. Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted disorders, HIV/AIDS

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T) 2 (CL)	Describe the normal growth and development during adolescence Assess the physical, reproductive and sexual changes during adolescence Promoting the development of life skills among adolescents	**Growth and development of of adolescents** • Review of Principles of Growth and Development • Assessment of Growth and Development of Adolescents, including physical, reproductive and sexual changes • Promoting Growth and Development of Adolescents • Development of life skills among adolescents	• Discussion & Demonstration • Visit to the School or Family with Adolescent	• Perform assessment of Adolescent in School or Family and write assessment report
II	1 (T) 1 (Lab)	Discuss the nutritional requirements of adolescents, food habits and food	**Nutritional needs of adolescents** • Nutritional requirements of adolescents Food habits and food fads prevalent in the adolescent	• Discussion • Demonstration	• Plan a One day Menu for an adolescent

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		fads prevalent in the adolescents			
III	2 (T) 2 (CL)	Identify the developmental needs of adolescents Demonstrate skills in identifying the developmental and psychosocial issues and challenges during adolescence	**Developmental needs of Adolescents** • Developmental needs of Adolescents • Developmental issues during Adolescence • Psychosocial issues during Adolescence • Challenges during Adolescence • Guiding Parents on meeting the developmental needs of Adolescents and handling their issues and Challenges	• Discussion • Demonstration • Visit to the Family with Adolescent	• Visit report
IV	1 (T) 1 (Lab) 2 (CL)	Demonstrate skills in communicating with adolescents Develop competency in providing the Guidance and Counselling to adolescents	**Communication, guidance and counseling** • Communicating with adolescents • Guidance and Counselling • Role of Parents	• Discussion • Demonstration • Role Play	• Assessment of role play
V	2 (T) 2 (CL)	Identify, and manage common health problems among adolescents including adjustment & conduct disorders, mental disorders, eating disorders, and substance use disorders	**Common health problems including mental health problems** • Common health problems among adolescents • Adjustment & conduct disorders • Mental disorders • Eating disorders • Substance use disorders	• Lecture cum discussion • Visit to the Adolescent Clinic	• Visit report
VI	2 (T)	Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted disorders, HIV/AIDS	**Reproductive and sexual health issues** • Reproductive and sexual health issues during adolescence • Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception • Sexually transmitted disorders, HIV/AIDS	• Lecture cum discussion	• Short answers

CLINICAL: 8 hours

Clinical Practice Competencies:

On completion of the module, the students will be able to:

1. Assesses the growth and development of adolescent
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promote the development of life skills among adolescents
4. Identify and guide the parents to meet the developmental needs of adolescents
5. Demonstrate skills in communicating with adolescents
6. Identify the developmental and Psychosocial issues and challenges during adolescence
7. Identify the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
8. Demonstrate skills in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents
10. Identify selected reproductive and sexual health issues of adolescents

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of adolescent/One day menu planning for adolescent) - 10 marks

SPORTS HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This Elective module is designed to enable students to gain knowledge about Sports Health, and role of Nursing in Sports Health, training, and management of sports injuries.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Demonstrate understanding of sports health.
2. Should be able to assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care.
3. Participate effectively as a member of sports health team.
4. Understanding the importance of conditioning and sports injuries Rehabilitation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	15 (T)	Demonstrate understanding of sports health and Fitness pre-requisite for sports. Assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care. Participate effectively as a member of sports health team. Understanding the importance of conditioning and sports injuries Rehabilitation.	1. Definition and scope of Sports Health and Physical Fitness 2. Pre-Participation exam for sports 3. On-field & Off-field evaluation of athlete 4. The Emergency Medical services System 5. Physiological Principle of strength Training/Conditioning, Deconditioning 6. Exercises and Environmental concern (Heat/Temperature Regulation, Acclimatization) 7. Common sports injuries & musculoskeletal assessment. 8. Therapeutic/Rehabilitation modalities overview. 9. On field management of sports injuries: Cryotherapy, sports taping etc. 10. Protective Equipment: protective wrapping, protective eye wear, Helmets, face mask. 11. Energy demands of Sports. 12. Nutritional supplements, 13. Ergogenic aids (Performance enhancing agents) and Doping.	• Guest lectures • Reading assignment by providing resources • Written assignment	• Short answers • Objective test • Viva voce
II	5 (P)	To assess the sports injury and provide emergency care		• Field work	• Evaluation of written field work

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

ACCREDITATION AND PRACTICE STANDARDS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop an understanding of quality assurance mechanism, the accreditation process and the accreditation and practice standards in nursing.

LEARNING OUTOMES:

On completion of the module, the student will be able to

1. Describe the Quality assurance mechanism in nursing
2. Explain the process of accreditation
3. Describe the accreditation standards for nursing institutions
4. Explain about the nursing practice standards and their rationale

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	5	Describe the Quality assurance mechanism in nursing	**Quality assurance in Nursing** • Review the current trends and practices of quality assurance in nursing • Definition and significance of quality assurance • Process of quality assurance • Components of quality assurance model • Methods of quality assurance evaluation • Quality assurance models of nursing in India • Roles and responsibilities of National and state nursing professional and regulatory bodies in quality assurance	• Lecture cum discussion	• MCQ • Short answers • Essay
II	5	Explain the process of accreditation	**Accreditation** • Definition of accreditation • The concepts of accreditation • Objectives of accreditation • Significance of accreditation • Types of accreditation • Accreditation process • Criteria for accreditations/Principal areas to be assessed • National and International accreditation agencies (education and health care organizations) ISO, UGC, NAAC, QCI, IEEA, JCI, NABH etc.	• Lecture cum discussion	• MCQ • Short answers • Essay
III	5	Describe the accreditation standards for nursing institutions	**Accreditation Standards for nursing institutions** • Definition of standards	• Lecture cum discussion	• MCQ • Short answers • Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Indian Nursing Council (INC) Standards - college/school and hospital/health facility • Standards for Quality Improvement in nursing**:** Standards Based Management and Recognition (SBM-R) approach • INC's Performance standards for various nursing institutions • International Council of Nurses (ICN) global standards for education and accreditation • International Confederation of Midwives (ICM) standards for professional Midwifery Education • WHO standards for educators		
IV	5	Explain about the nursing practice standards and their rationale	**Nursing Practice standards** • Code of ethics and professional conduct for nurses in India • ICN - Code of ethics • Definition of practice standards • National and international standards for nursing practice o INC standards for practice o National Nursing Commission Bill (Indian Nursing and Midwifery Council ACT (proposed) o ICM standards for professional Midwifery Practice o ICN global standards for practice • International nursing excellence - Magnet Recognition program, JCI standards • India - NABH nursing excellence standards	• Lecture cum discussion • Visit to NAAC or NABH accredited nursing institutions and health care facility	• MCQ • Short answers • Essay • Visit report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

LEARNING RESOURCES:

- UGC guidelines
- NACC guidelines
- NABH manual
- JCI manual
- INC, ICN, ICM & WHO websites - For education and practice standards

DEVELOPMENTAL PSYCHOLOGY

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: The module is designed to assist the students to acquire knowledge regarding the various dimensions of development and special concerns related to various age groups and to develop an insight into the problems of various age groups. Further it is aimed at helping the students to recognise the deviated behaviours of various age groups and apply the principles and strategies of mental hygiene for the promotion of mental health and prevention, diagnosis and management of mental illness

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Explain the theories related to the development of an individual
2. Describe prenatal development and special concerns related to the prenatal development
3. Explain the dimensions of development and special concerns related to infancy
4. Explain the dimensions of development and special concerns related to early childhood
5. Discuss the characteristics, dimensions of development and special concerns related to adolescence
6. Explain the characteristics, dimensions of development and special concerns related to adulthood
7. Describe the dimensions of development and special concerns related to elderly

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Describe growth and development	**Introduction** • Definition - Growth and development • Definition - Developmental psychology • Difference between growth and development • Dimensions of growth and development • Stages of development • Principles of development • Characteristics of development • Factors influencing the growth and development • Scope of developmental psychology	• Review • Lecture cum discussion	• Long Essay • Short Essay
II	2	Explain the theories related to the development of an individual	**Theories related to development** • Sigmund Freud Psychosexual development • Erik Erikson Psychosocial development • Piaget theory of cognitive development • Kohlberg's theory of moral development	• Lecture cum discussion	• Long Essay • Short Essay
III	3	Describe prenatal development and special concerns related to the prenatal development	**Prenatal development** • Term: Prenatal development • Stages of prenatal development • Principles of hereditary and twins mechanism	• Lecture cum discussion	• Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Factors affecting the prenatal development • Process of labour • Complications during labour that affects the transition period • Postnatal period • Complications in postnatal period that affects the transition period • Measures to reduce the risk during prenatal development, process of labour and postnatal period • Genetic counselling • Rooming in or KMC		
IV	2	Explain the dimensions of development and special concerns related to infancy	**Infancy** • Definition - Newborn and infancy • Normal characteristics of infancy • *Dimensions of growth and development in infancy:* o Physical, physiological and motor development o Cognitive development or intellectual development o Emotional development o Social development o Moral or character development o Language development • Special concerns in infancy • Remedial measures: Prevention and management • Newborn care and its significance • Breastfeeding and weaning and its significance • Parenthood • Low birth weight and its developmental consequences • Early infant stimulating programme	• Lecture cum discussion • Symposium	• Long Essay • Short Essay
V	2	Explain the dimensions of development and special concerns related to early childhood	**Early childhood** • Definition - Toddler and preschooler • Normal characteristics of toddler and preschooler • *Dimensions of growth and development in toddler and preschooler:* o Physical and motor development o Cognitive development or intellectual development o Emotional development o Social development o Moral or character development o Language development • Special concerns in toddler and preschooler • Remedial measure: Prevention and management	• Lecture cum discussion • Panel discussion	• Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Lower order basic needs according to Maslow and its significance • Parent child bonding and its significance • Toilet training and its significance		

VI	2	Explain the characteristics, dimensions of development and special concerns related to middle and late adulthood	**Middle and late childhood**
			• Definition - School going children
			• Normal characteristics of School going children
			• *Dimensions of growth and development in middle and late childhood:*
			  ○ Physical and motor development
			  ○ Cognitive development or intellectual development
			  ○ Emotional development
			  ○ Social development
			  ○ Language development
			  ○ Moral or character development
			• Special concerns in school going children
			• Remedial measure: Prevention and management
			• Role of discipline in moral development
			• Role of play in the process of development
			• Effect of parental employment in the process of development
			• Effect of mass media in the process of development
			• Role of peer group in the process of development
			• Role of behavioural technique in the process of development
			• Parenting style and its significance
			• School based mental health programme and services
			• Teacher student relationship and its significance
				• Lecture cum discussion
				• Role play
					• Long Essay
					• Short Essay

VII	3	Discuss the characteristics, dimensions of development and special concerns related to adolescence	**Adolescence**
			• Definition - Adolescence and puberty
			• *Review:*
			  ○ Physiological and hormonal changes
			  ○ Sexual maturation: primary and secondary characteristics
			  ○ Psychological impact of puberty
			• Need for understanding the adolescence
			• Normal characteristics of adolescence
			• Misunderstanding about adolescence
				• Lecture cum discussion
				• Debate
					• Long Essay
					• Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods

			• Adjustment and adolescence
			• *Dimensions of development in adolescence:*
			  ○ Cognitive development or intellectual and mental development
			  ○ Personality development
			  ○ Emotional development
			  ○ Social development
			  ○ Moral development
			• Special concerns in adolescence
			• Remedial measure: Prevention and management
			• Role of peer group or gang in the process of development
			• Role of parent, family and its relationship in the process of development		

VIII	2	Explain the characteristics, dimensions of development and special concerns related to adulthood	**Adulthood** • Definition - Early adulthood and middle adulthood • Physical changes in adulthood • Cognitive changes in adulthood • Personality development in adulthood • Emotional development in adulthood • Social development in adulthood • Unique issues in adulthood: career, marriage, parenthood • Special concerns in adulthood • Remedial measure: Prevention and management	• Lecture cum discussion • Panel discussion	• Short Essay
IX	2	Describe the dimensions of development and special concerns related to elderly	**Elderly** • Definition - Geriatric, Elderly • Theories of elderly • Physiological changes in elderly • Psychosocial changes in elderly • Special concerns in elderly • Remedial measure: Prevention and management • Terminal illness and elderly • Death and dying: Grief, palliative and hospice care	• Lecture cum discussion • Panel discussion • Case study • Visit to the old age home	• Essay • Short answers • Evaluation of Visit report/case study report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

MENOPAUSAL HEALTH

PLACEMENT: V &VI SEMESTER

THEORY & CLINICAL: 1 credit (20 hours)
THEORY: 10 hours
CLINICAL: 10 hours

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in menopausal health. It further helps the students to develop competency in providing quality care to the menopausal women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Understand the concept of menopausal health in women.
2. Review and analyze the anatomy and physiology of menopause.
3. Develop competencies in providing quality care to these women.
4. Educate women and families about the problems faced by them.
5. Discuss the importance of hormone replacement therapy.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	1 (T)	Understand the concept and types of menopause	**Introduction** • Definition - menopausal health • Concept and types of menopause	• Lecture	• Objective test
II	2 (T)	Analyze the endocrinal changes during menopause	**Role of hormones in menopause** • Effect of hormones such as estrogen, androgen • Progesterone and gonadotrophin	• Lecture	• Short answers • Objective test
III	2 (T)	Describe Organ changes	**Organ changes during menopause** • Changes in the organs • Ovaries fallopian tubes, uterus, vagina, breast, bladder and urethra • Loss of muscle tone	• Lecture • Written assignment	• Short answers
IV	2 (T) 4 (CL)	Assess women to identify menopausal signs and symptoms	**Assessment of menopausal women** • History and physical examination • Diagnostic tests • Documentation	• Lecture • Assessment of women	• Short answers • Evaluation of assessment
V	3 (T) 6 (CL)	Describe management	**Management of menopause** • Identification of menopause • Management of the symptoms • Education and counseling of women and families • Hormone replacement therapy	• Lecture cum discussion • Case presentation	• Short answers • Evaluation of Case report

CLINICAL: 10 hours

Clinical Practice Competencies:

On completion of the course, the students will be able to

1. Counsel the women and her families
2. Understand the endocrinology of menopause
3. Perform the assessment and diagnose the women and plan proper nursing care
4. Educate the women about self care
5. Prepare the women for hormone replacement therapy

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

HEALTH ECONOMICS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to understand the basic concept of economics, health economics, the relationship between health and economic development, demand and supply, concept of cost and financing systems of health care services in India. This will enable them to appreciate financial aspects of health care services.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Explain the meaning of economics and health economics.
2. Analyze the relationship between health and economic development.
3. Explain the concept of demand and supply.
4. Describe the structure of health care industry and characteristics of market for health care services.
5. Analyze the concept of cost in health care.
6. Discuss financing system of health care services in India.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Understand the meaning and purpose of Economics and Health Economics	**Introduction to Economics** • Definition and meaning • Dimensions of economics Micro and Macro-economics • Positive and Normative economics	• Lecture cum discussion	• MCQ • Short answers
II	4	Explain the basic concepts, focus and areas of health economics Discuss the Implications of economic development to the health care services Describe the factors that contribute to health problems in India and their solution	**Introduction to Health Economics** • Concept of health economics • Scope of Health economics • Focus of health economics • Areas of health economics • The economics of health and health care service, health and economic development. • Implications of economic development to the health care services • Mechanism and sources of health financing in the country. • Causes of health problems in India. • Solutions to health problems	• Lecture cum discussion • Case study	• MCQ • Short answers • Essay
III	4	Explain the concept and types of cost Describe Cost benefit analysis and Cost-effectiveness analysis in health care	**Cost of Health Care** • Concept of cost, types of costs • Opportunity cost, total fixed and variable cost, average marginal and sunk cost • cost benefit analysis and cost effectiveness analysis	• Lecture cum discussion • Case study	• Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
IV	4	Understand the basic concept of financial management Explain the characteristics of health care industry	**Demand and Supply in Health Care** • Concept of demand, need, supply, input, output, production function, industry and market • Structure of health care industry • Characteristics of health care services market • Demand side and supply side • Factors affecting demand • Factors influencing demand for medical care • Factors affecting supply	• Lecture cum discussion • Assignment on Demand for medical care	• MCQ • Evaluation of Assignment
V	6	Describe the sources of financing of health care services Discuss various health insurance schemes Explain the role of state and central government on financing of health care services.	**Financing of Health Care in India** • Financing system and allocation • Sources of financing of health care services • Health plans and outlays, the relative role of state and central government on financing of health care services • Factors influencing the state's ability to finance health care services • Role of voluntary organizations in health care • Public Private Partnership in providing services in health care	• Lecture cum discussion • Assignment - role of voluntary organizations in health care	• Short answers • Evaluation of assignment

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

SCIENTIFIC WRITING SKILLS

PLACEEMENT: VII & VIII SEMESTER

Credit & Hours: 1 Credit (20 hours)
THEORY: 12 hours
PRACTIICAL/LAB: 8 hours

DESCRIPTION: This module is designed to provide the students with the necessary knowledge base to succeed in publishing scientific papers in indexed national/international journals or to prepare a grant application.

LEARNING OUTCOMES: On completion of this module, the student will be able to

1. Get inspiration and motivation to write effectively, concisely and clearly.
2. Understand the process and basics of scientific writing and publishing.
3. Equip them with skills to cite and manage references.
4. Write scientific manuscript for publication in indexed national/international journals.
5. Apply the principles in grant writing.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Get motivated to write	**Basics of good writing** • What makes good writing - choice of words, components of sentences and sentence structure, using tenses • Clarity, brevity and fitness - punctuation, paragraphs, logic and organization • Motivation for writing	• Discussion • Review of news article	• Quiz
II	2 (T) 2 (L)	Explain the basics and principles writing a scientific manuscript Develop skills to cite and manage references	**Basics of writing a scientific manuscript** • Definition and types • Characteristics - clear, simple and impartial • Reading scientific literature • *General Principles:* o Ask right questions o Avoid jargon where possible o Focus on your reader o Don't show off o Create a compelling opening paragraph o Be confident o Learn how to KISS (Keep it short and simple) o Get active - Use the active voice rather than the passive one. o Check for errors o Use a style guide - writing style, referencing style o Tools for reference management	• Lecture cum discussion • Reading scientific literature-Exercise	• Quiz • Test paper
III	2 (T)	Develop skills in preparing conference	**Writing for conferences and publications** • *Conferences*	• Discussion	• Test paper

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		materials and presentation skills. Describe the publishing process and ethics	○ Developing conference materials: abstracts, posters and oral presentation. ○ Conference presentation skills • *Publications:* ○ Phases for writing-planning, writing and publishing phase ○ Reporting guidelines - CONSORT, STROBE etc ○ Journals - choosing the right type of journal ○ Publication ethics ○ Author's responsibility ○ Editorial process ○ Plagiarism check tools	• Preparation of a conference paper/ poster • Guided reading • Written assignment - reporting guidelines	• Assessment of the written assignment
I	4 (T) 4 (L)	Develop skills in writing a research paper	**Writing a research paper** • General principles • Writing an Abstract • IMRAD format - ○ Introduction ○ Methods ○ Results ○ And ○ Discussion	• Lecture cum discussion/ Workshop on writing • Exercise on writing an abstract • Exercise on writing an effective discussion • Writing exercise for preparation of research paper for publication	• Evaluation of the prepared research manuscript for publication
IV	2 (T) 2 (L)	Develop beginning skills of preparing a grant proposal with basic understanding	**Overview of grant writing** • Purposes • Funding opportunities • Principles • Writing a grant proposal	• Exercise: Identify grant opportunities • Exercise: write a grant proposal	• Evaluation of the exercise

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

LACTATION MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY: 0.5 Credit (10 hours)

CLINICAL: 0.5 Credit (10 hours)

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in lactation management . It also help the students to develop competency in providing quality care to the lactating women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to:

1. Understand the concept of lactation and anatomy of breast in postpartum women.
2. Discuss the physiology of lactation and composition of breast milk.
3. Develop competencies in providing quality nursing care to these women based on nursing process.
4. Educate women and families about the lactation problems faced by them and improve in breast feeding.
5. Dicuss the advantages of breast feeding and bonding.
6. Explain the importance of taking well balanced diet to facilitate lactation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Review the anatomy of breast	**Anatomy of breast-Review** • Concept and anatomy of breast	• Use of models • Discussion	• Objective test • Short answers
II	2 (T)	Explain the Physiology of lactation	**Physiology of lactation** • Physiology of lactation • Benefits of breast feeding	• Discussion	• Short answers • Objective test
III	4 (T) 8 (CL)	Provide quality nursing care	**Management of lactation** • Quality nursing care to patient for lactating women • Well-balanced diet • Technique of breast feeding • Prevention of breast engorgement	• Demonstration • Discussion • Case presentation	• Short answers • Objective test • Case report
IV	2 (T) 2 (L)	Provide health education	**Health education** on • Diet during lactation • Breast care • Clothing • Personal hygiene etc.	• Case method • Demonstration	• Case report

CLINICAL PRACTICE COMPETENCIES:

On completion of the program student will be able to:

1. Provide quality nursing care to lactating women
2. Develop competency in supporting breast feeding
3. Educate lactating women regarding self-care and well-balanced diet, personal care etc.
4. Develop competency in records and reports
5. Encourage mother child bonding
6. Develop competency in preventing breast complications

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

SEXUALITY AND HEALTH

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 16 hours

PRACTICAL: 4 hours

DESCRIPTION: Sexuality and Health is an elective module for nursing students who wish to make a future in sexual Health clinics/counseling. This module intends to train the nurses to help people to maintain sexual health.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Identify the basic components of the human reproductive system and describe the basic functions of the various reproductive organs.
2. Describe the changes that occur during puberty and secondary sexual characteristics.
3. Examine and evaluate the risk factors associated with exposure to blood-borne diseases.
4. Determine 'safer' sex practices.
5. Develop strategies to reduce sexual risk.
6. Explain the role of trust and ways to establish trust in a relationship.
7. Evaluate implications and consequences of sexual assault on a victim.
8. Explain the legislations related to sexual assaults in India.
9. Provide health education on safer sex practices and prevent the sexually transmitted diseases/blood borne diseases.
10. Assess a victim of sexual abuse/assault/harassment/child abuse.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	3	Identify the basic components of the human reproductive system, and describe the basic functions of the various reproductive organs Describe the changes that occur during puberty; secondary sexual characteristics	**Introduction to Sexuality -** • Anatomy of the human reproductive system and the basic functions; fertilization, conception. • Changes during puberty (physical, emotional and social) • Secondary sexual characteristics	• Lecture cum discussion	• Short answers • Objective test
II	3	Examine and evaluate the risk factors associated with exposure to blood-borne diseases	**Risk factors associated with exposure to blood-borne diseases -** HIV, AIDS, Hepatitis • Sharing needles • Body piercing • Tattooing • Helping someone who is bleeding etc.	• Lecture cum discussion • Role play • Group Discussion	• Short answers • Objective test

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
III	3	Determine 'safer' sex practices Develop strategies to reduce sexual risk Explain the role of trust and ways to establish trust in a relationship	'**Safer' sex practices:** • Communicate with partner • Maintain abstinence • Limit partners • Access/use condoms/ contraceptives properly *Strategies to reduce sexual risk:* • Abstain from drugs and alcohol, date in groups, use assertive behavior • Expectations & commitments in a relationship • Role of trust and ways to establish trust in a relationship	• Lecture cum discussion	• Short answers • Objective test
IV	5	Analyze the implications and consequences of sexual assault on a victim Explain the legislations related to sexual assaults in India	**Sexual assault/abuse** *Implications and consequences of sexual assault on a victim* • Child sexual abuse • Sexual assault of boys • Incest • Intimate partner sexual abuse • Rapes *Legislation related to sexual assault in India* • Criminal Law amendment Act -2013 • Sexual Harassment at workplace • Protection of children against sexual offences	• Lecture cum discussion • Case discussion • Guest lecture • Reading/written assignments	• Short answers • Objective test
V	2	Develop understanding and skills on sexual health education	**Sexual Health Education** • Health education - principles and application • Health education on safer sex practices • Counselling the sexually assaulted/abused child/ adolescent/adults	• Observe/practice at the education/ counseling clinic/ centre	• Evaluation of the report
VI	4 (P)	Develop skills in assessment of sexually abused victim and provide sexual health education	• Sexual health education - adolescents and young adults • Assessment of sexually abused victim - child/adolescent/adult	• Clinical field	• Assessment of sexually abused victim • Sexual health education

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

STRESS MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This module is designed to enhance the understanding of students about stress and its effects on human behavior and physiology. Further it discusses the techniques and implementation of stress management in personal and professional life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe stress and stressors.
2. Identify the causes of unwanted stress.
3. Understand how stress works and its effects on human behavior and physiology.
4. Develop techniques to avoid stress affect the personal and professional life.
5. Utilize effective stress reduction techniques.
6. Develop a Personal Action Plan for Stress Management.

CONTENT OUTLINE

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
I	3 (T) 1 (P)	Describe stress and stressors. Identify the causes of unwanted stress.	**Introduction** • Concept of stress, definition • Types of stress: positive, negative • Various sources of stress: environmental, social, physiological, psychological • Types of stressors: internal and external	• Lecture cum discussion • Practice session on identifying own stressors	• Short answers • Objective test • Assessment of practice sessions
II	5 (T) 1 (P)	Understand how stress works and its effects on human behavior and physiology	**Stress and its effect on human physiology and behaviour** • Body's response to stress: Hans Selye's General Adaptation Syndrome • Stress Cycles: distress and wellness cycle • Cognitive appraisal of stressors • Stress symptoms: emotional, behavioural, physical • Stress and diseases: cancer, Gastric ulcer, Bronchial asthma, effect on endocrine glands, Psycho-sexual disease, Anxiety Neurosis • Assessing stress levels Holmes - Rahe - life change index	• Lecture cum discussion • Practice session assessment of stress level of self and peer group, scoring & classifying the risk.	• Short answers • Essay types • Preparing stress assessment scale
III	5 (T) 1 (P)	Develop techniques to avoid stress affect the personal and professional life.	**Stress avoidance techniques** • Individual difference in resistance to stress: optimism & pessimism • Strategies of stress prevention	• Lecture cum discussion • Practice session • Role play on Conflict	• Assessment of the skills based on the check list • Short answers

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
			& management ○ Challenging stressful thinking/resilience and stress ○ Problem solving and time management ○ Physical methods of stress reduction ○ Preparing for occupational stress ○ Care of self: Nutrition & other lifestyle issues ○ Conflict management in relationship	Management/ Use of problem - solving approach for professional problem	• Essay types
IV	2 (T) 2 (P)	Utilize effective stress reduction techniques Develop a Personal Action Plan for Stress Management	**Stress reduction strategies** • Utilizing stress reduction techniques • Relaxation techniques: • abdominal breathing • progressive relaxation, • massage • biofeedback • autogenic training-self hypnosis • visualization and mental imagery • Enhance self esteem • Support groups	• Exercise on: Relaxation techniques: abdominal breathing, progressive relaxation. • Develop a Personal Action Plan for Stress Management	• Assessment of the skills based on the check list

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

JOB READINESS/EMPLOYABILITY IN HEALTH CARE

PLACEMENT: VII & VIII SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to prepare the nursing students towards entering their profession in terms of clinical context, the complexity of care requirements, and utilization of resources available and in terms of soft skills.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Demonstrate the employability skills required at different levels and in different roles across the health sector.
2. Identify the personal skills, qualities, values, attributes and behaviours needed at each career level.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain about the Nursing career and various roles in nursing	**Introduction** • Nursing - A Career in Life • Roles and responsibilities of an employee • Adaptation towards working environment • Career Guidance - Employment opportunities in Nursing	• Lecture cum discussion	• Essay on career opportunities
II	5	Describe the characteristics and values that an individual must have before they can do a job effectively.	**Employability Skill** • Job-readiness attributes o Communication skill o Technological skill o Teamwork skill o Interpersonal skill o Critical thinking and Problem-solving skill o Planning and organizing skill o Conceptual and analytical skill o Self confidence o Inter profession practice o Work psychology-positivity workplace attitude o Stress awareness and management • Soft skills	• Lecture cum discussion • Role playing	• Practical assessment
III	5	Describe the safe care and skills required to manage the workforce environment	**Complexity of care** • Safe Practice • Practice within scope of practice • Management of workload • Ability work effectively within the health care team • Legal and ethical boundaries	• Lecture cum discussion • Written assignment on scope of practice	• Assessment of assignment
IV	3	Explain the importance of employability towards meeting	**Autonomy and Supervision** • Autonomy - Accountability, Responsibility, Recognition of scope of practice • Supervision/Delegation	• Lecture cum discussion	• Quiz

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		the organization goal.			
V	5	Enumerate the subject knowledge required to provide quality care.	**Application of Knowledge** • Generalist Nursing Knowledge • Knowledge on Quality Care • Knowledge on Ethical aspects • Knowledge on Legal aspects • Critical Appraisal • Knowledge seeking behaviour	• Lecture cum discussion	• Self-discovery exercise

ASSESSMENT METHODS

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

APPENDIX 03

INTERNAL ASSESSMENT: DISTRIBUTION OF MARKS

I SEMESTER

S.No.	Name of the Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Internal Marks
	Theory			
1	Communicative English	10	15	25
2	Applied Anatomy & Applied Physiology	10	15	25
3	Applied Sociology & Applied Psychology	10	15	25
4	Nursing Foundation I	10	15	25
	Practical			
5	Nursing Foundation I	10	15	25

II SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Marks
	Theory			
1	Applied Biochemistry and Applied Nutrition & Dietetics	10	15	25
2	Nursing Foundation II including First Aid I & II	10	15	25 I & II = 25+25 = 50/2
3	Health/Nursing Informatics & Technology	10	15	25
	Practical			
4	Nursing Foundation I & II II	10	15	25 I & II = 25+25 = 50

III SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Marks
	Theory			
1	Applied Microbiology and Infection Control including Safety	10	15	25
2	Pharmacology I and Pathology I	10	15	25
3	Adult Health Nursing I with integrated pathophysiology including BCLS module	10	15	25
	Practical			
4	Adult Health Nursing I	20	30	50

IV SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Pharmacology II & Pathology II I & II	10	15	25 I & II = 25+25 = 50/2
2	Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing	10	15	25
3	Professionalism, Professional values & Ethics including bioethics	10	15	25
	Practical			
4	Adult Health Nursing II	20	30	50

V SEMESTER

S.No.	Course	Continuous Assessment	Sessional Theory/ Practical Exams	Total Marks
	Theory			
1	Child Health Nursing I	10	15	25
2	Mental Health Nursing I	10	15	25
3	Community Health Nursing I	10	15	25
4	Educational Technology/ Nursing Education	10	15	25
5	Introduction to Forensic Nursing and Indian Laws	10	15	25
	Practical			
6	Child Health Nursing I	10	15	25
7	Mental Health Nursing I	10	15	25
8	Community Health Nursing I	20	30	50

VI SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Child Health Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
2	Mental Health Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
3	Nursing Management and Leadership	10	15	25
4	Midwifery/Obstetrics and Gynecology I	10	15	25
	Practical			
5	Child Health Nursing II I & II	10	15	25 I & II = 25+25 = 50
6	Mental Health Nursing II I & II	10	15	25 I & II = 25+25 = 50
7	Midwifery/Obstetrics and Gynecology (OBG) Nursing I	10	15	25

VII SEMESTER

S.No.	Course	Continuous assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Community Health Nursing II	10	15	25
2	Nursing Research & Statistics	10	15	25
3	Midwifery/Obstetrics and Gynecology (OBG) Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
	Practical			
4	Community Health Nursing II	20	30	50
5	Midwifery/Obstetrics and Gynecology (OBG) Nursing II I & II	10	15	25 I & II = 25+25 = 50

VIII SEMESTER (Internship)

S.No.	Course	Continuous performance evaluation	OSCE	Total Marks
1	Competency assessment – 5	Each specialty – 10 5×10 = 50	Each specialty – 10 5×10 = 50	100

APPENDIX 04

INTERNAL ASSESSMENT GUIDELINES THEORY

I. CONTINUOUS ASSESSMENT: 10 marks

1. Attendance – **2 marks** (95-100%: 2 marks, 90-94: 1.5 marks, 85-89: 1 mark, 80-84: 0.5 mark, <80: 0)
2. Written assignments (Two) – **10 marks**
3. Seminar/microteaching/individual presentation (Two) – **12 marks**
4. Group project/work/report –

6 marks Total = 30/3 = 10

If there is mandatory module in that semester, marks obtained by student out of 10 can be added to 30 totaling 40 marks

Total = 40/4 = 10 marks

II. SESSIONAL EXAMINATIONS: 15 marks

Two sessional exams per course

Exam pattern:

MCQ – 4×1 = 4

Essay – 1×10 = 10

Short – 2×5 = 10

Very Short – 3×2 = 6

30 arks × 2 = 60/4 = 15

III. CONTINUOUS PRACTICAL ASSESSMENT MARKS: 10

1. Attendance – **2 marks** (95-100%: 2 marks, 90-94: 1.5 marks, 85-89: 1 mark, 80-84: 0.5 mark, <80: 0)
2. Clinical assignments – **10 marks**

   (Clinical presentation – 3, drug presentation & report – 2, case study report – 5)
3. Continuous evaluation of clinical performance – **10 marks**
4. End of posting OSCE – **5 marks**
5. Completion of procedures and clinical requirements – **3 marks Total = 30/3 = 10**

IV. SESSIONAL

EXAMINATIONS: 15 marks

Exam pattern:

OSCE – 10 marks (2-3 hours)

DOP – 20 marks (4-5 hours)

{DOP – Directly observed practical in the clinical setting}

Total = 30/2 = 15

Note: For Adult Health Nursing I, Adult Health Nursing II, Community Health Nursing I & Community Health Nursing II, the marks can be calculated as per weightage. Double the weightage as 20 marks for continuous assessment and 30 for sessional exams.

V. COMPETENCY ASSESSMENT: (VIII SEMESTER)

Internal assessment

Clinical performance evaluation – 10 × 5 specialty =

50 marks OSCE = 10 × 5 specialty = 50 marks

Total = 5 specialty × 20 marks = 1

APPENDIX 05

I. UNIVERSITY THEORY QUESTION PAPER PATTERN (For 75 marks)

1. **Section A – 37 marks and Section B – 38 marks**

   a. **Applied Anatomy & Applied Physiology:** Applied Anatomy – Section A and Applied Physiology – Section B,

   b. **Applied Sociology & Applied Psychology:** Applied Sociology – Section A and Applied Psychology – Section B

   c. **Applied Microbiology & Infection Control including Safety:** Applied Microbiology – Section A and Infection Control including Safety – Section B

   Section A (37 marks)

   MCQ – 6 × 1 = 6

   Essay – 1 × 10 = 10

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

   Section B (38 marks) MCQ – 7 × 1 = 7

   Essay – 1 × 10 = 10

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

2. **Section A – 25 marks and Section B – 50 marks**

   Applied Biochemistry & Nutrition & Dietetics: Applied Biochemistry – Section A and Applied Nutrition & Dietetics – Section B

   Section A (25 marks)

   MCQ – 4 × 1 = 4

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

   Section B (50 marks) MCQ – 8 × 1 = 8

   Essay/situation type – 1 × 10 = 10

   Short – 4 × 5 = 20

   Very Short – 6 × 2 = 12

3. **Section A – 38 marks, Section B – 25 marks and Section C – 12 marks**

Pharmacology, Pathology and Genetics: Pharmacology – Section A, Pathology – Section B and Genetics – Section C

Section A (38 marks)

MCQ – 7 × 1 = 7

Essay – 1 × 10 = 10

Short – 3 × 5 = 15

Very Short – 3 × 2 = 6 **Section B (25 marks)**

MCQ – 4 × 1 = 4

Short – 3 × 5 = 15

Very Short – 3 × 2 = 6 **Section C (12 marks)**

MCQ – 3 × 1 = 3

Short – 1 × 5 = 5

Very Short – 2 × 2 = 4

4. **Section A – 55 marks and Section B – 20 marks**

Research and Statistics: Research – Section A and Statistics – Section B

Section A (55 marks)

MCQ – 9 × 1 = 9

Essay/situation type – 2 × 15 = 30

Short – 2 × 5 = 10

Very Short – 3 × 2 = 6 **Section B (20 marks)**

MCQ – 4 × 1 = 4

Short – 2 × 5 = 10

Very Short – 3 × 2 = 6

5. **Marks 75 (For all other university exams with 75 marks)**

MCQ – 12 × 1 = 12

Essay/situation type – 2 × 15 = 30

Short – 5 × 5 = 25

Very Short – 4 × 2 = 8

6. **College Exam (End of Semester) – 50 marks (50/2 = 25 marks)**

MCQ – 8 × 1 = 8

Essay/situation type – 1 × 10 = 10

Short – 4 × 5 = 20

Very Short – 6 × 2 = 12

II. UNIVERSITY PRACTICAL EXAMINATION – 50 marks OSCE – 15 marks

DOP – 35 marks

III. COMPETENCY ASSESSMENT – University Exam (VIII SEMESTER)

Integrated OSCE including all 5 specialties (Stations based on every specialty) = 5 specialty 5 × 20 = 100 marks

Total of 5 Examiners: external – 2 and internal – 3 (One from each specialty)

Internal examiners may be chosen from college faculty with required qualification or from hospital with required qualification

APPENDIX 06

Clinical Logbook for B.Sc. Nursing Program

(Procedural Competencies/Skills)

I & II SEMESTER

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
I SEMESTER						
I	**Communication and Documentation**					
1	Maintaining Communication andinterpersonal relationship with patient and families					
2	Verbal Report					
3	Recording/Documentation of patient care (Written Report)					
II	**Monitoring Vital Signs**					
	Temperature					
4	Oral					
5	Axillary					
6	Rectal					
7	Tympanic					
	Pulse					
8	Radial					
9	Apical					
10	*Respiration*					
11	*Blood Pressure*					
III	**Hot & Cold Application**					
12	Cold Compress					
13	Hot Compress					
14	Ice Cap					
15	Tepid sponge					
IV	**Health Assessment (Basic – First year level)**					
16	Health History					
17	Physical Assessment – General &system wise					
18	Documentation of findings					
V	**Infection Control in Clinical Settings**					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
19	Hand hygiene (Hand washing &Hand rub)					
20	Use of personal and protectiveequipment					
VI	**Comfort**					
21	Open Bed					
22	Occupied Bed					
23	Post-operative Bed					
24	Supine Position					
25	Fowler ‘s Position					
26	Lateral Position					
27	Prone Position					
28	Semi Prone Position					
29	Trendelenburg Position					
30	Lithotomy Position					
31	Changing Position of helplesspatient (Moving/Turning/ Logrolling)					
32	Cardiac table/Over-bed table					
33	Back Rest					
34	Bed Cradle					
35	Pain Assessment (Initial & Reassessment)					
VII	**Safety**					
36	Side rail					
37	Restraint (Physical)					
38	Fall risk assessment & post fallassessment					
VIII	**Admission & Discharge**					
39	Admission					
40	Discharge					
41	Transfer (within hospital)					
IX	**Mobility**					
42	Ambulation					

43	Transferring patient from & to					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
	bed & wheelchair					
44	Transferring patient from & tobed & stretcher					
45	Range of Motion Exercises(ROM)					
X	**Patient Education**					
46	Individual Patient Teaching					
II SEMESTER						
XI	**Hygiene**					
47	Sponge bath/Bed bath					
48	Pressure Injury Assessment					
49	Skin care and care of pressurepoints					
50	Oral hygiene					
51	Hair wash					
52	Pediculosis treatment					
53	Perineal Care/Meatal care					
54	Urinary Catheter care					
XII	**Nursing Process-Basic level**					
55	Assessment and formulatingnursing diagnosis					
56	Planning the nursing Care					
57	Implementation of Care					
58	Evaluation of Care (Reassessment& Modification)					
XIII	**Nutrition & Fluid Balance**					
59	24 Hours Dietary Recall					
60	Planning Well balanced diet					
61	Making fluid plan					
62	Preparation of nasogastric tubefeed					
63	Nasogastric tube feeding					
64	Maintaining intake & output chart					
65	Intra Venous Infusion Plan					

XIV	Elimination					
S.No.	**Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes procedures A/O**	**DATE**		**Signature of the Tutor/Faculty**
				Skill Lab/ Simulation Lab	**Clinical Area**	
66	Providing Bedpan					
67	Providing Urinal					
68	Enema					
69	Bowel Wash					
XV	**Diagnostic Tests-Specimen collection**					
70	Urine Specimen for RoutineAnalysis					
71	Urine Specimen for Culture					
72	Timed urine specimen collection					
73	Feces specimen for routine					
74	Sputum Culture					
	Urine Testing					
75	Ketone					
76	Albumin					
77	Reaction					
78	Specific Gravity					
XVI	**Oxygenation Needs/Promoting Respiration**					
79	Deep Breathing & CoughingExercises					
80	Steam inhalation					
81	Oxygen administration using facemask					
82	Oxygen administration usingnasal prongs					
XVII	**Medication Administration**					
83	Oral Medications					
84	Intramuscular					
85	Subcutaneous					
86	Rectal Suppositories					
XVIII	**Death and Dying**					
87	Death care/Last Office					
XIX	**First Aid and Emergencies**					
	Bandages & Binders					
88	Circular					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
89	Spiral					
90	Reverse Spiral					
91	Recurrent					
92	Spica					
93	Figure of eight					
94	Eye					
95	Ear					
96	Caplin					
97	Jaw					
98	Arm Sling					
99	Abdominal Binder					
	******					
100	Basic CPR (first aid module)					

III & IV SEMESTER

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/SimulationLab	Clinical Area	
III SEMESTER						
I	**MEDICAL**					
	Intravenous therapy					
1	IV cannulation					
2	IV maintenance & monitoring					
3	Administration of IV medication					
4	Care of patient with CentralLine					
	Preparation, assisting, and after care of patients undergoing diagnostic procedures					
5	Thoracentesis					
6	Abdominal paracentesis					
	Respiratory therapies and monitoring					
7	Administration of oxygen usingventuri mask					
8	Nebulization					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
9	Chest physiotherapy					
10	Postural drainage					
11	Oropharyngeal suctioning					
12	Care of patient with chestdrainage					
	Planning therapeutic diet					
13	High protein diet					
14	Diabetic diet					
	*****					
15	Performing and monitoringGRBS					
16	Insulin administration					
II	**SURGICAL**					
17	Pre-Operative care					
18	Immediate Post-operative care					
19	Post-operative exercise					
20	Pain assessment and management					
	Assisting diagnostic procedures and after care of patients undergoing					
21	Colonoscopy					
22	ERCP					
23	Endoscopy					
24	Liver Biopsy					
	*****					
25	Nasogastric aspiration					
26	Gastrostomy/Jejunostomy feeds					
27	Ileostomy/Colostomy care					
28	Surgical dressing					
29	Suture removal					
30	Surgical soak					
31	Sitz bath					
32	Care of drain					

III	**CARDIOLOGY**					
33	Cardiac monitoring					
34	Recording and interpreting ECG					
35	Arterial blood gas analysis –					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
	interpretation					
36	Administration of cardiac drugs					
37	Preparation and after care ofpatients undergoing cardiac Catheterization					
38	Performing BCLS					
	Collection of blood sample for					
39	Blood grouping/cross matching					
40	Blood sugar					
41	Serum electrolytes					
	*****					
42	Assisting with blood transfusion					
43	Assisting for bone marrowaspiration					
44	Application of antiembolismstockings (TED hose)					
45	Application/maintenance of sequential Compression Device					
IV	**DERMATOLOGY**					
46	Application of topical medication					
47	Intradermal injection-Skin allergytesting					
48	Medicated bath					
V	**COMMUNICABLE**					
49	Intradermal injection-BCG and Tuberculin skin Test or Mantouxtest					
50	Barrier nursing & Reverse barriernursing					

51	Standard precautions-Hand hygiene, use of PPE, needle stickand sharp injury prevention, Cleaning and disinfection, Respiratory hygiene, waste disposal and safe injection practices					
VI	**MUSCULOSKELETAL**					
52	Preparation of patient with Myelogram/CT/MRI					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
53	Assisting with application &removal of POP/Cast					
54	Preparation, assisting and aftercare of patient with Skin traction/skeletal traction					
55	Care of orthotics					
56	Muscle strengthening exercises					
57	Crutch walking					
58	Rehabilitation					
VII	**OR**					
59	Position and draping					
60	Preparation of operation table					
61	Set up of trolley with instrument					
62	Assisting in major and minoroperation					
63	Disinfection and sterilization ofequipment					
64	Scrubbing procedures – Gowning, masking and gloving					
65	Intra operative monitoring					
	IV SEMESTER					
I	**ENT**					
1	History taking and examinationof ear, nose & throat					
2	Application of bandages toEar & Nose					
3	Tracheostomy care					
	Preparation of patient, assisting and monitoring of patients undergoing diagnostic procedures					
4	Auditory screening tests					
5	**Audiometric tests**					
	*****					

6	Preparing and assisting in special procedures like Anterior/posteriornasal packing, Ear Packing and Syringing					
7	Preparation and after care of patients undergoing ENT surgicalprocedures					
8	Instillation of ear/nasal					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
	medication					
II	**EYE**					
9	History taking and examination of eyes andinterpretation					
	Assisting procedures					
10	Visual acuity					
11	Fundoscopy, retinoscopy, ophthalmoscopy, tonometry					
12	Refraction tests					
	*****					
13	Pre and postoperative care of patient undergoing eye surgery					
14	Instillation of eye drops/medication					
15	Eye irrigation					
16	Application of eye bandage					
17	Assisting with foreign bodyremoval					
III	**NEPHROLOGY & UROLOGY**					
18	Assessment of kidney and urinarysystem • History taking and physicalexamination • Testicular self-examination • Digital rectal exam					
	Preparation and assisting with diagnostic and therapeutic procedures					

19	Cystoscopy, Cystometrogram					
20	Contrast studies – IVP					
21	Peritoneal dialysis					
22	Hemodialysis					
23	Lithotripsy					
24	Renal/Prostate Biopsy					
25	Specific tests – Semen analysis,gonorrhea test					
	*****					
26	Catheterization care					
27	Bladder irrigation					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
28	Intake and output recording andmonitoring					
29	Ambulation and exercise					
IV	**BURNS & RECONSTRUCTIVE SURGERY**					
30	Assessment of burns wound					
31	First aid of burns					
32	Fluid & electrolyte replacementtherapy					
33	Skin care					
34	Care of Burn wounds o Bathing o Dressing					
35	Pre-operative and post-operativecare of patient with burns					
36	Caring of skin graft and postcosmetic surgery					
37	Rehabilitation					
V	**NEUROLOGY**					
38	History taking, neurological Examination – EX. Use of Glasgowcoma scale					
39	Continuous monitoring thepatients					
40	Preparation and assisting for various invasive and non- invasive diagnostic procedures					

41	Care of patient undergoing neurosurgery including rehabilitation					
VI	**IMMUNOLOGY**					
42	History taking and Physicalexamination					
43	Immunological status assessment and interpretation of specific test(e.g. HIV)					
44	Care of patient with lowimmunity					
VII	**ONCOLOGY**					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
45	History taking & physical examination of cancer patients					
46	Screening for common cancers ex.TNM classification					
	Preparation, assisting and after care patients undergoing diagnostic procedures					
47	Biopsies/FNAC					
48	Bone-marrow aspiration					
	Preparation of patients and assisting with various modalities of treatment					
49	Chemotherapy					
50	Radiotherapy					
51	Hormonal therapy/ Immunotherapy					
52	Gene therapy/any other					
53	PET scan/Bone scan					
54	Rehabilitation					
VIII	**EMERGENCY**					
55	Practicing triage ‘					
56	Primary and secondary survey inemergency					
57	Examination, investigations & their interpretations, in emergency & disaster situations					
58	Emergency care of medical andtraumatic injury patients					
59	Documentation, and assisting inlegal procedures in emergency unit					

60	Managing crowd					
61	Counseling the patient and familyin dealing with grieving & bereavement					
IX	**CRITICAL CARE**					
62	Assessment of critically illpatients					
63	Assisting with arterial puncture					
64	Assisting with ET tube intubation& extubation					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
65	ABG analysis and interpretation – respiratory acidosis, respiratoryalkalosis, metabolic acidosis, metabolic alkalosis					
66	Setting up of ventilator modes and settings and care of patienton ventilator					
67	Setting up of trolley with instruments/critical care equipment					
68	Monitoring and maintenance ofChest drainage system					
69	Bag and mask ventilation					
70	Assisting with starting and maintenance of Central andperipheral lines invasive					
71	Setting up of infusion pump, anddefibrillator					
72	Administration of drugs via infusion, intracardiac, intrathecal,epidural					
73	Monitoring and maintenance ofpacemaker					
74	ICU care bundle					
75	Management of the dying patientin the ICU					
X	**Geriatric**					
76	History taking and Assessment ofGeriatric patient					
77	Geriatric counseling					

78	Comprehensive Health assessment (adult) after modulecompletion					
V & VI SEMESTER – CHILD HEALTH NURSING I & II						
I	**PEDIATRIC MEDICAL & SURGICAL**					
	Health assessment – Taking history & Physical examination and nutritional assessment of					
1	Neonate					
2	Infant					
3	Toddler					
4	Preschooler					
5	Schooler					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
6	Adolescent					
	Administration of medication/fluids – Calculation, preparation and administration of medication					
7	Oral					
8	I/M					
9	I/V					
10	Intradermal					
11	Subcutaneous					
	*****					
12	Calculation of fluid requirements					
13	Preparation of different strengthsof I/V fluids					
14	Administration of IV fluids					
15	Application of restraints					
	Administration of O_2 inhalation by different methods					
16	Nasal Catheter/Nasal Prong					
17	Mask					
18	Oxygen hood					
	****					
19	Baby bath/sponge bath					
20	Feeding children by Katori &spoon/paladai, cup					
	Collection of specimens for common investigations					
21	Urine					

22	Stool					
23	Blood					
	*****					
24	Assisting with commondiagnostic procedures (Lumbar puncture, bone marrowaspiration)					
	Health education to mothers/parents – Topics					
25	Prevention and management ofMalnutrition					
26	Prevention and management ofdiarrhea (Oral rehydration therapy)					
	*****					
27	Feeding & Complementaryfeeding					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
28	Immunization schedule					
29	Play therapy					
30	Conduct individual and groupplay therapy sessions					
31	Prevention of accidents					
32	Bowel wash					
33	Administration of suppositories					
	Care for ostomies:					
34	Colostomy Irrigation					
35	Ureterostomy					
36	Gastrostomy					
37	Enterostomy					
	*****					
38	Urinary catheterization &drainage					
	Feeding					
39	Naso-gastric					
40	Gastrostomy					
41	Jejunostomy					
	Care of surgical wounds					

42	Dressing					
43	Suture removal					
II	**PEDIATRIC OPD/IMMUNIZATION ROOM**					
	Growth and Developmental assessment of children					
44	Infant					
45	Toddler					
46	Preschooler					
47	Schooler					
48	Adolescent					
	*****					
49	Administration of vaccination					
50	Health/Nutritional education					
III	**NICCU/PICU**					
51	Assessment of newborn					
52	Care of preterm/LBW newborn					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
53	Kangaroo care					
54	Neonatal resuscitation					
55	Assisting in neonatal diagnosticprocedures					
56	Feeding of high-risk newborn –EBM (spoon/paladai)					
57	Insertion/removal/feeding –Naso/oro-gastric tube					
58	Administration of medication –oral/parenteral					
59	Neonatal drug calculation					
60	Assisting in exchange transfusion					
61	Organizing different levels ofneonatal care					
62	Care of a child on ventilator/CPAP					
63	Endotracheal Suction					
64	Chest Physiotherapy					
65	Administration of fluids withinfusion pumps					

66	Total Parenteral Nutrition					
67	Recording & reporting					
68	Cardiopulmonary Resuscitation –PLS					
V & VI SEMESTER – MENTAL HEALTH NURSING I & II						
	PSCHIATRY OPD					
1	History taking					
2	Mental status examination (MSE)					
3	Psychometric assessment (Observe/practice)					
4	Neurological examination					
5	Observing & assisting intherapies					
	Individual and group psycho education					
6	Mental hygiene practiceeducation					
7	Family psycho-education					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
	CHILD GUIDANCE CLINIC					
8	History Taking & mental statusexamination					
9	Psychometric assessment (Observe/practice)					
10	Observing and assisting invarious therapies					
11	Parental teaching for child withmental deficiency					
	IN-PATIENT WARD					
12	History taking					
13	Mental status examination (MSE)					
14	Neurological examination					
15	Assisting in psychometric assessment					
16	Recording therapeutic communication					
17	Administration of medications					
18	Assisting in Electro-convulsiveTherapy (ECT)					

19	Participation in all therapies					
20	Preparation of patients for Activities of Daily living (ADL)					
21	Conducting admission anddischarge counseling					
22	Counseling and teaching patientsand families					
	COMMUNITY PSYCHIATRY & DEADDICTION CENTRE					
23	Conducting home visit and casework					
24	Identification of individuals withmental health problems					
25	Assisting in organizations ofMental Health camp					
26	Conducting awareness meetingsfor mental health & mental illness					
27	Counseling and Teaching familymembers, patients and community					
28	Observation of deaddiction care					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
	V SEMESTER – COMMUNITY HEALTH NURSING I INCLUDING ENVIRONMENTAL SCIENCE & EPIDEMIOLOGY					
1	Interviewing skills (using communication and interpersonalskills)					
2	Conducting community needsassessment/survey					
3	Observation skills					
4	Nutritional assessment skills					
5	Teaching individuals and familieson nutrition-food hygiene and safety, healthy lifestyle and health promotion					
6	BCC (Behaviour change communication) skills					
7	Health assessment including nutritional assessment- differentage groups • Children under five • Adolescent • Woman					

8	Investigating an epidemic –Community health survey					
9	Performing lab tests – Hemoglobin, blood sugar, bloodsmear for malaria, etc.					
10	Screening, diagnosis and primarymanagement of common health problems in the community and referral of high-risk clients (Communicable & NCD)					
11	Documentation skills					
12	Home visit					
13	Participation in national healthprograms					
14	Participation in school healthprograms					
V SEMESTER – EDUCATIONAL TECHNOLOGY/NURSING EDUCATION						
1	Writing learning outcomes					
2	Preparation of lesson plan					
3	Practice Teaching/ Microteaching					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/Simulation Lab	**Clinical Area**	
4	Preparation of teaching aids/media					
	Preparation of assessment tools					
5	Construction of MCQ tests					
6	Preparation of observationchecklist					
VI SEMESTER – NURSING MANAGEMENT & LEADERSHIP						
	Hospital and Nursing Service Department					
1	Preparation of organogram (hospital/nursing department)					
2	Calculation of staffing requirements for a nursingunit/ward					
3	Formulation of Job description ofnursing officer (staff nurse)					
4	Preparation of Patient assignmentplan					
5	Preparation of duty roster for staff/students at different levels					

6	Preparation of logbook/MMF forspecific equipment/ materials					
7	Participation in Inventory controland daily record keeping					
8	Preparation and maintenance ofrecords & reports such as incident reports/adverse reports/audit reports					
9	Participation in performance appraisal/evaluation of nursingstaff					
10	Participate in conducting in- service education for the staff					
	College & Hostel					
11	Preparation of organogram ofcollege					
12	Formulation of job descriptionfor tutor					
13	Participation in performanceappraisal of tutor					
14	Preparation of Master plan, time-table and clinical rotation					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
15	Preparation of student anecdotes					
16	Participation in clinicalevaluation of students					
17	Participation in planning and conducting practical examinationOSCE – end of posting					
VI & VII SEMESTER – MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING I & II						
I	**ANTENATAL CARE**					
	Health assessment of antenatal woman					
1	History Taking including obstetrical score, Calculation ofEDD, gestational age					
2	Physical examination: head tofoot					
3	Obstetrical examination includingLeopards maneuvers & auscultation of Fetal heart sound (fetoscope/stethoscope/ Doppler)					
	Diagnostic tests					

4	Urine pregnancy test/card test					
5	Estimation of hemoglobin usingSahle‘s hemoglobinometer					
6	Advice/assist in HIV/HBsAg/VDRL testing					
7	Preparation of peripheral smearfor malaria					
8	Urine testing for albumin andsugar					
9	Preparation of mother for USG					
10	Kick chart/DFMC (Daily Fetaland Maternal Chart)					
11	Preparation and recording ofCTG/NST					
	*****					
12	Antenatal counseling for each trimester including birth preparedness and complicationreadiness					
13	Childbirth preparation classes forcouples/family					
14	Administration of Td/TT					
15	Prescription of iron & folic acidand calcium tablets					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
II	**INTRANATAL CARE**					
16	Identification and assessment ofwoman in labour					
17	Admission of woman in labour					
18	Performing/assisting CTG					
19	Vaginal examination duringlabour including Clinical pelvimetry					
20	Plotting and interpretation ofpartograph					
21	Preparation for birthing/delivery – physical and psychological					
22	Setting up of the birthingroom/delivery unit and newborn corner/care area					

23	Pain management during labour-non-pharmacological					
24	Supporting normal births/conductnormal childbirth in upright positions/evidence based					
25	Essential newborn care					
26	Basic newborn resuscitation					
27	Management of third stage of labour – Physiologic management/active management(AMTSL)					
28	Examination of placenta					
29	Care during fourth stage oflabour					
30	Initiation of breast feeding andlactation management					
31	Infection prevention duringlabour and newborn care					
III	**POSTNATAL CARE**					
32	Postnatal assessment and care					
33	Perineal/episiotomy care					
34	Breast care					
35	Postnatal counseling-diet,exercise & breast feeding					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of theTutor/ Faculty**
				Skill Lab/Simulation Lab	**Clinical Area**	
36	Preparation for discharge					
IV	**NEWBORN CARE**					
37	Assessment of newborn					
38	Weighing of newborn					
39	Administration of Vitamin K					
40	Neonatal immunization – Administration of BCG, HepatitisB vaccine					
41	Identification of minor disordersof newborn and their management					
V	**CARE OF WOMEN WITH ANTENATAL, INTRANATAL & POSTNATAL COMPLICATIONS**					
42	High risk assessment – identification of antenatal complications such as pre- eclampsia, anemia, GDM, Antepartum hemorrhage etc.					
43	Post abortion care & counseling					

44	Glucose challenge test/GlucoseTolerance test					
45	Identification of fetal distress andits management					
46	Administration of MgSo4					
47	Administration of antenatal corticosteroids for preterm labour					
48	Assisting with Medical inductionof labour					
49	Assist in Surgical induction – stripping and artificial rupture ofmembranes					
50	Episiotomy (only if required) andrepair					
51	Preparation for emergency/elective caesarean section					
52	Assisting in caesarean section					
53	Preparation of mother and assistin vacuum delivery					
54	Identification and assisting in management of malpresentationand malposition during labour					
55	Preparation and assisting in low					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
	forceps operation					
56	Preparation and assisting in emergency obstetric surgeries					
57	Prescription/administration of fluids and electrolytes throughintravenous route					
	Assisting in procedures					
58	Assisting in Manual removal ofthe placenta					
59	Assisting in Bimanual compression of uterus/Balloontamponade for atonic uterus					
60	Assisting in Aortic compressionfor PPH					
61	Identification and first aid management of PPH & obstetricshock					

62	Assisting in management ofobstetric shock					
63	Identification and assisting in management of puerperal sepsisand administration of antibiotics					
64	Management of breast engorgement and infections					
65	Management of thrombophlebitis					
	HIGH RISK NEWBORN (Some aspects of high risk newborn care are included in Child Health Nursing)					
66	Identification of high-risknewborn					
67	Care of neonate under radiantwarmer					
68	Care of neonate on phototherapy					
69	Referral and transportation ofhigh-risk newborn					
70	Parental counselling – sickneonate and neonatal loss					
	FAMILY WELFARE					
71	Postpartum Family planningcounseling					
72	Postpartum family planning –Insertion and removal of PPIUCD/PAIUCD					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
73	Counselling of the woman forPostpartum sterilization					
74	Preparation and assisting intubectomy					
	OTHER PROCEDURES					
75	Preparation and assisting forD&C/D&E operations					
76	Observation/Assisting in ManualVacuum Aspiration					
77	Assessment of women withgynaecological disorders					
78	Assisting/performing Pap smear					
79	Performing Visual inspection ofcervix with acetic acid					
80	Assisting/observation of cervicalpunch biopsy/ Cystoscopy/Cryosurgery					

81	Assisting in gynecologicalsurgeries					
82	Postoperative care of womanwith gynecological surgeries					
83	Counsel on Breast self-examination					
84	Counseling couples withinfertility					
85	Completion of safe delivery appwith certification					
VII SEMESTER – COMMUNITY HEALTH NURSING II						
1	Screening, diagnosing, management and referral ofclients with common conditions/emergencies					
2	Antenatal and postnatal care at home and health centre					
3	Conduction of normal childbirth& newborn care at health centre					
4	Tracking every pregnancy andfilling up MCP card					
5	Maintenance of records/ registers/reports					
6	Adolescent counseling & participation in youth friendly					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of theTutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
	services					
7	Counseling for safe abortionservices					
8	Family planning counseling					
9	Distribution of temporary contraceptives – condoms, OCP ‘s, emergency contraceptives, Injectable MPA					
10	Insertion of interval IUCD					
11	Removal of IUCD					
12	Participation in conducting vasectomy/tubectomy camp					

13	Screening, diagnosis, primary management and referral of clients with occupational healthproblems					
14	Health assessment of elderly					
15	Mental Health screening					
16	Participation in community diagnosis – data management					
17	Writing health centre activityreport					
18	Participation in organizing andconducting clinic/health camp					
19	Participation in disaster mockdrills					
20	Co-ordinating with ASHAs and other community health workers					
VII SEMESTER – NURSING RESEARCH & STATISTICS						
	Research Process Exercise					
1	Statement of the problem					
2	Formulation of Objectives &Hypotheses					
3	Literature review of researchreport/article					
4	Annotated bibliography					
5	Preparation of sample researchtool					
	Analysis & Interpretation of data – Descriptive statistics					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
6	Organization of data					
7	Tabulation of data					
8	Graphic representation of data					
9	Tabular presentation of data					
10	Research Project (Group/Individual) Title:					
VIII SEMESTER (INTERNSHIP)						

Note: Maximum of 30% of all skills/procedures can be performed by students in skill lab/simulation lab for all

clinical nursing Courses except Community Health Nursing and Mental Health Nursing in which the percentage allowed is only 10%

* – When the student is found competent to perform the skill, it will be signed by the faculty/tutor.

Students: Students are expected to perform the listed skills/competencies many times until they reach level 3 competency, after which the preceptor signs against each competency.

Preceptors/faculty: Must ensure that the signature is given for each competency only after they reach level 3.

- Level 3 competency denotes that the student is able to perform that competency without supervision
- Level 2 Competency denotes that the student is able to perform each competency with supervision
- Level 1 competency denotes that the student is not able to perform that competency/skill even with supervision

Signature of the Faculty Coordinator **Signature of the HOD/Principal**

APPENDIX 07

CLINICAL REQUIREMENTS

S.No.	Clinical Requirement	Date	Signature of theFaculty
	I & II SEMESTER		
	NURSING FOUNDATION I & II		
1	History Taking -2 1. 2.		
2	Physical Examination -2 1. 2.		
3	Fall risk assessment – 2		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	1. 2.		
4	Pressure Sore Assessment – 21. 2.		
5	Nursing Process – 21. 2.		
6	Completion of first aid module		
7	Completion of Health assessment module		
	III SEMESTER – ADULT HEALTH NURSING I		
	Medical		
1	Care Study – 1		
2	Health education – 1		
3	Clinical presentation/care note – 1		
	Surgical		
4	Care study – 1		
5	Health education – 1		
6	Clinical Presentation/Care note – 1		
	Cardiac		
7	Cardiac assessment – 1		
8	Drug presentation – 1		

	Communicable		
9	Clinical presentation/Care note – 1		
	Musculoskeletal		
10	Clinical presentation/Care note – 1		
	OR		
11	Assist as circulatory nurse- 5 i. ii. iii . iv. v.		
12	Assist as scrub nurse in minor surgery-5 i. ii.		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	iii. iv. v.		
13	Positioning & draping-5 i. ii. iii .iv v.		
14	Assist as scrub nurse in major surgeries 5 i. ii. iii . iv. v.		
15	Completion of BCLS module		
	IV SEMESTER – ADULT HEALTH NURSING II		
	ENT		
1	ENT assessment of an adult-2 i. ii.		
2	Observation and activity report of OPD		

3	Clinical presentation – 1		
4	Drug Book		
	EYE		
5	Eye assessment i. Adult – 1 ii. Geriatric – 1		
6	Patient-teaching – 1		
7	Clinical Presentation– 1		
	NEPHROLOGY & UROLOGY		
8	Assessment of adult – 1 Assessment of Geriatric-1		
9	Drug presentation – 1		
10	Care study/Clinical presentation – 1		
	BURNS AND RECONSTRUCTIVE SURGERY		

S.No.	Clinical Requirement	Date	Signature of theFaculty
11	Burn wound assessment – 1		
12	Clinical presentation – 1		
13	Observation report of Burns unit		
14	Observe cosmetic/reconstructive procedures		
15	Neuro-assessment 2 i ii.		
16	Unconscious patient – 1		
17	Care study/case presentation – 1		
18	Drug presentation – 1		
	IMMUNOLOGY		
19	Assessment of immune status		
20	Teaching of isolation to patient and family care givers		
21	Nutritional management		
22	Care Note – 1		
	ONCOLOGY		
23	Observation report of cancer unit		
24	Assessment of each system cancer patients – 2		
25	Care study/clinical presentation – 1		

26	Pre and post-operative care of patient with various modes of cancer treatment such as chemotherapy, radiation therapy, surgery, BMT, etc. –3(at least) i. ii. ii.		
27	Teaching on BSE to family members		
	EMERGENCY		
28	Primary assessment of adult– 1		
29	Immediate care (IV access establishment, assisting in intubation,suction, etc.)		
30	Use of emergency trolley		
	CRITICAL CARE		
31	Assessment of critically ill i. Adult ii. Geriatric		

S.No.	Clinical Requirement	Date	Signature of theFaculty
32	Care note/Clinical presentation – 1		
	GERIATRIC		
33	Geriatric assessment – 1		
34	Care note/clinical presentation – 1		
35	Fall risk assessment 1		
36	Functional status assessment – 1		
37	Completion of Fundamentals of Prescribing module		
38	Completion of Palliative care module		
V & VI SEMESTER – CHILD HEALTH NURSING I & II			
	Pediatric medical		
1	Nursing care plan – 1		
2	Case presentation – 1		
3	Health talk – 1		
	Surgical		
4	Nursing care plan – 1		
5	Case study/presentation – 1		
	OPD/Immunization Room		

6	Growth and Developmental study: i. Infant – 1 ii. Toddler – 1 iii. Preschooler – 1		
	NICCU/PICU		
7	Newborn assessment – 1		
8	Nursing Care Plan – 1		
9	Kangaroo mother care – 2		
10	Nursing care plan of high-risk newborn – 1		
11	Completion of ENBC module		
12	Completion of FNBC module		
13	Completion of IMNCI module		
14	Completion of PLS module		
V & VI SEMESTER – MENTAL HEALTH NURSING I & II			
	Psychiatry OPD		
1	History taking and Mental status examination2 i.		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	ii.		
2	Health education – 1		
3	Observation report of OPD		
	Child guidance clinic		
4	Case work – 1		
	Inpatient Ward		
5	Case study – 1		
6	Care plan – 2		
7	Clinical presentation1		
8	Process recording 2		
9	Maintain drug book		
	Community psychiatry & Deaddiction Centre		
10	Case work – 1		
11	Observation report on field visits		
12	Visit to deaddiction Centre		

V SEMESTER – COMMUNITY HEALTH NURSING – I INCLUDING ENVIRONMENTAL SCIENCE & EPIDEMIOLOGY			
1	Community needs assessment/survey (Rural/Urban) – 1		
2	Visits to – SC/HWC – PHC – CHC		
3	Observation of nutritional programsAnganwadi		
4	**Observation visits**		
	i. Water purification site and Water quality tests		
	ii. Milk diary		
	iii. Slaughter-house		
	iv. Market		
	v. Sewage disposal site		
	vi. Rain water harvesting		
	vii. Slaughter-house		
5	Nutritional assessment – Adult 1		
6	Individual health teaching – Adult 1		

S.No.	Clinical Requirement	Date	Signature of theFaculty
7	Use of AV aids – flash cards/posters/flannel graphs/flip charts (AnyTwo) i. ii.		
8	Health assessment of i. Woman – 1 ii. Infant/under five child – 1 iii. Adolescent – 1 iv. Adult – 1		
9	Growth monitoring of children under five – 1		
10	Documentation i. Individual records – 1 ii. Family records – 1		
11	Investigation of an epidemic – 1		
12	Screening and primary management of i. Communicable diseases – 1 ii. NCD – 1		

13	Home visits – 2		
14	Participation in national health programs – 2		
15	Participation in school health program – 1		
V SEMESTER – EDUCATIONAL TECHNOLOGY/NURSING EDUCATION			
1	Microteaching – 2 i. Theory – 1 ii. Practical/lab – 1		
2	Field Visit to nursing educational institution – regional/nationalorganization		
VI SEMESTER – NURSING MANAGEMENT & LEADERSHIP			
1	Field visit to Hospital – regional/national organization		
VI & VII SEMESTER – MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING I & II			
1	Antenatal assessment and care – 20		
2	Postnatal assessment and care – 15		
3	Assessment of labour using partograph – 10		
4	Per vaginal examination – 10		
5	Observing normal childbirths/deliveries– 10		
6	Assisting in conduction of normal childbirth – 10		
7	Conduction of normal deliveries – 10		

S.No.	**Clinical Requirement**	**Date**	**Signature of theFaculty**
8	Assisting in abnormal/instrumental deliveries – 5		
9	Performing placental examination – 5		
10	Episiotomy and suturing (only if indicated)– 3		
11	Assist/observe Insertion of PPIUCD–2		
12	Newborn assessment – 10		
13	Newborn resuscitation – 5		
14	Kangaroo mother care – 2		
	Nursing Care Plan/Clinical presentation with Drug Study		
15	*Antenatal care* Normal (care plan) – 1 High risk (case study/Clinical presentation) – 1		
16	*Intrapartum care* High risk (Clinical presentation) – 1		

17	*Postnatal care* Normal (care plan) – 1 High risk (Clinical presentation) – 1		
18	*Newborn care* Normal (care plan) – 1		
19	Gynecological conditionCare plan – 1		
20	Health talk – individual/group – 2		
21	Counseling mothers and family members		
22	Visit to • Peripheral health facility/Laqshya certified labour room • Infertility Centre (Virtual/videos)		
23	Completion of SBA module		
24	Completion of safe delivery app		
VII SEMESTER – COMMUNITY HEALTH NURSING II			
1	Screening and primary management ofof i. Minor ailments – 2 ii. Emergencies – 1 iii. Dental problems – 1 iv. Eye – 1 v. ENT – 1		
2	Primary management and care based on protocols approved byMOH&FW (Home/health Centre)		

S.No.	Clinical Requirement	Date	Signature of theFaculty
3	Screening and primary management of i. High risk pregnancy ii. High risk neonate		
4	Assessment of i. Antenatal – 1 ii. Intrapartum – 1 iii. Postnatal – 1 iv. Newborn – 1		
5	Conduction of normal childbirth and documentation – 2		
6	Immediate newborn care and documentation – 1		
7	Family planning counseling – 1		
8	Group health education (Rural/urban) – 1		
9	Adolescent counseling– 1		
10	Family case study (Rural/urban) – 1		

11	Screening, diagnosis, primary management and referral of clients withoccupational health problems – 2 i. ii.		
12	Health assessment (physical & nutritional) of elderly – 1		
13	Mental health screening survey – 1		
14	**Group project –** Community diagnosis (data management)		
15	Writing report on health Centre activity – 1		
16	Participation in organizing and conducting under five/antenatalclinic/health camp – 2 i. ii.		
17	Participation in disaster mock drills		
18	Field visits - Biomedical waste management site - AYUSH Centre - Industry - Geriatric home		
19	Report on interaction with MPHW/HV/ASHA/AWWs (Any 2)1. 2.		
VII SEMESTER – NURSING RESEARCH			
1	Research Project – Group/IndividualTitle:		

Signature of the Faculty coordinator **Signature of the HOD/Principal**

Name of ICU	Clinical Condition	Number of days caregiven	Signature of Faculty/Preceptor

Signature of the Faculty Coordinator **Signature of the HOD/Principal**

SCHOOL OF ISLAMIC STUDIES & LANGUAGES
Baba Ghulam Shah Badshah University
Rajouri, Jammu & Kashmir-185234
Website: www.bgsbu.ac.in , E- mail: deansisl@bgsbu.ac.in

Minutes of the Meeting
Board of Studies (Arabic)

In order to frame and finalise the syllabi of four years Undergraduate Programme (BA Arabic), a number of meetings of faculty members of the Department of Arabic was held in the Department. Finally the scheme and the draft syllabi were prepared in view of the guidelines of NEP 2020.

The same has been sent to the subject experts for their comments and valuable suggestions. After receiving their responses the final meeting of Board of Studies of the Department was held on September 15, 2022 in the office Chamber of Associate Dean School of Islamic Studies and Languages. The members once again went through the comments of the experts and finalised the said syllabi (two semesters only).

It was also resolved that the same be forwarded to the Dean Academic Affairs for necessary action and final approval.

Members Present:

1. Dr. Shams Kamal Anjum — Associate Dean, School of Islamic Studies and Languages, (Chairman)
2. Dr Md Affan — (Member)
3. Dr. Mohd. Azam — (Member)
4. Dr. Manzar Alam — (Member)

Signature of the Members:

Dr. Shams Kamal Anjum 16/9/2022

Dr Md Affan,

Dr. Mohd. Azam

Dr. Manzar Alam

****

BGSBU

Md Affan <drmdaffan@bgsbu.ac.in>

Syllabi of BA Arabic for Approval

2 messages

Md Affan <drmdaffan@bgsbu.ac.in> Thu, Aug 24, 2023 at 11:20 AM
To: "Dr.Abdul Majid Qazi Qazi" <drabdulmajidqazi@gmail.com>

Respected sir,

I would like to inform you that the Honorable Vice Chancellor has been pleased to appoint you as a member of the Board of Studies of four years Undergraduate Program (BA).

Therefore I am forwarding herewith a PDF copy of the draft syllabi of BA Arabic (two semesters 3rd and 4th only) with following details:

1. BA-MJR-301 (Arabic Text and Grammar-III)
2. BA-MJR-302 (Translation and Composition-I)
3. BA-MDC-306 (Arabic-III)
4. BA-MJR-401 (Arabic Text –IV)
5. BA-MJR-402 (Arabic Grammar-IV)
6. BA-MJR-403 (Translation and Composition: II)
7. BA-MJR-404 (History of Arabic Literature: I)

sir, I request your good-self to kindly go through the content of the abovementioned syllabi and guide us with your valuable comments in this regard, so that the same could be incorporated in the syllabi and placed before the Board of Studies of the said program for further necessary action.

It is also requested that the matter may please be treated as urgent.

Thanking you

Sincerely yours

Dr. Md. Affan
Coordinator
Department of Arabic
BGSB University
Rajouri
9419629241

Syllabus BA (Arabic) 2022 NEP, 3rd and 4th sems for approval.pdf
757K

Dr.Abdul Majid Qazi Qazi <drabdulmajidqazi@gmail.com> Mon, Aug 28, 2023 at 11:40 PM
To: Md Affan <drmdaffan@bgsbu.ac.in>

Dear Dr Affan
Thank you for your mail. I went through the content of the syllabus prepared by your Department in accordance with the requirements of NEP2020 design. I have been involved with several similar exercises at AMU and Jamia. I Have also been in touch with the Department of Arabic DU and JNU with regard to the new developments. In this context your Department has produced a very impressive document. I am happy that you have focused on minute details of courses and exhibited a remarkable clarity of vision. In my opinion it is one of the finest documents. However, the revision and critical evaluation of the exercise will be an ongoing process and we will learn new things by experimentation of other options as well. It can be put before BoS for approval and implementation.
With warm regards

[Quoted text hidden]

--
(Dr. Abdul Majid Qazi)
Professor and Head
Department of Arabic
Faculty of Humanities and Languages

BGSBU

Md Affan <drmdaffan@bgsbu.ac.in>

Syllabus of Persian for Suggestions and Comments

2 messages

Md Affan <drmdaffan@bgsbu.ac.in> Mon, Aug 28, 2023 at 10:58 AM
To: szabbasjnu@gmail.com

Sir,

Being a member of the Board of Studies, BGSBU, the Department of Arabic requests you to kindly go through the syllabus of B.A Arabic 3rd semester and shall be waiting eagerly for your comments and suggestions as previous year. The PDF copy of the same is being sent to you for your consideration. Further I would like to draw your kind attention that we have already started the classes, therefore our request is to do the needful as soon as possible.

Thanking you

Sincerely yours

Coordinator
Department of Arabic
BGSBU

Persian III for Approval.pdf
378K

syed abbas <szabbasjnu@gmail.com> Tue, Aug 29, 2023 at 1:21 PM
To: Md Affan <drmdaffan@bgsbu.ac.in>

با ادب و احترام سلام علیکم.
سر آپ کا بنایا ہوا سلیبس بلکل نیو ایج کیشن پالیسی کے مطابق بہتر و اعلی معیار کا ہے اور ریفرنس بوکس بھی وقت کی ضرورت کے مطابق ہیں،امید کرتے ہیں شاگرد اس سے مکمل طور پر مستفید ہوں گے۔
والسلام
سید ضیغم عباس

[Quoted text hidden]

BGSBU

Md Affan <drmdaffan@bgsbu.ac.in>

Comments

2 messages

HoD English Department <headenglish@bgsbu.ac.in> Mon, Aug 28, 2023 at 10:03 AM
To: Md Affan <drmdaffan@bgsbu.ac.in>

Respected Sir,
After going through the contents of the syllabus of the BA, third semester, I give my approval of its implementation.

Regards,
Dr Romina Rashid
Head, Dept. of English.

Md Affan <drmdaffan@bgsbu.ac.in> Mon, Aug 28, 2023 at 11:06 AM
To: HoD English Department <headenglish@bgsbu.ac.in>

Thanks a lot.
[Quoted text hidden]

شعبۂ اردو بابا غلام شاہ بادشاہ یونیورسٹی راجوری
DEPARTMENT OF URDU
Baba Ghulam Shah Badshah University
Rajouri (J&K)-185234
Website: www.bgsbu.ac.in E- mail: headurdu@bgsbu.ac.in

Regarding the Urdu syllabus composed by the department of Arabic BGSB University Rajouri. I found that the department has done a good job and a satisfactory work, in this regard the syllabus is original is mature, I recommend the department to consider this syllabus.

Dr. L.H. Nayyar
Assistant professor
Department of Urdu

syed abbas Mon, Sep 12, 5:50 PM

The course is upto the mark. Kindly go ahead for its introduction in the respective class. Kindly send me the official communication regarding inclusion of my name in BOS of your department.

Thank you
Dr Syed Zaigham Abbas

Dr.Shams Kamal Anjum <headarabic@bgsbu.ac.in> Tue, Sep 13, 5:43 PM
to syed

Total — 39

Sep 14, 2022, 4:43 PM (5 days ago)

[redacted]bdul Majid Qazi Qazi

to me

Dear Dr Anjum

Thank you for sharing the syllabi of Arabic Text and Grammar -I and Arabic Text and Grammar- II. The structure of the syllabi of Arabic, prepared and suggested by you, is a very brilliant and well-thought out document. Since the NEP 2020 requires a complete overhauling and restructuring of the education system at all levels, the academic community all over the country is busy with this mammoth task and in a race with the time. You have come up with a wonderful prototype which will definitely inspire others.

I congratulate you for accomplishing this academic goal.

With warm regard and best wishes

--

(Dr. Abdul Majid Qazi)
Professor and Head
Department of Arabic
Faculty of Humanities and Languages
Jamia Millia Islamia University
New Delhi-110025
INDIA
Mobile :91-9999459494

38

شعبۂ اردو بابا غلام شاہ بادشاہ یونیورسٹی راجوری
DEPARTMENT OF URDU
Baba Ghulam Shah Badshah University
Rajouri (J&K)-185234
Website: www.bgsbu.ac.in E- mail: headurdu@bgsbu.ac.in

Ref. BGSBU/URDU/22/241
Dated: ..14./.09./2022

Head
Department of Arabic,
BGSB University,
Rajouri.

Sir,

In reference to the e-mail regarding the inclusion of my name in the Board of Studies for B. A Course. I extent my grate thanks to HVC and our worthy Dean and Head of Arabic Department with regard to the syllabus of Arabic Course code B.A MNR-102(Urdu Ghazal) and B.A MNR-202(Urdu Qasida). I found that the syllabus codified is as per the requirement. The syllabus work is original in nature. Therefore I deem no space for change in the current syllabus. Thereby I recommended the syllabus to concerned authorities in its current form.

Thanking you.

Sincerely yours

14/9/2022.

Dr. Layaqat Hussain Nayyar

Coordinator

Department of Urdu (BGSBU)

37

HoD English Department Wed, Sep 14, 12:43 AM (5 days ago)

to me

Respected Sir,
I have gone through the syllabus for BA Arabic 2022, and I found it appropriate and up to the mark.

Regards,
Dr Romina Rashid
Head, Dept of English.

H[redacted] Management

Wed, Sep 14, 1:49 AM (5 days ago)

to me

Respected Sir
I would like to express my gratitude for being appointed as a member of the Board of Studies of BA Arabic .
The syllabus of soft skill for Business(BA MD 103/BA MD-203) ,Professional Excellence in Business (BA-SEC-105) and Event Management (BA-SEC-205) referred to me has been prepared with due care and after taking into consideration the relevance and need as per the marketability.
The title of course code BA-SEC-105 is "Professional **Enhancement** in Business" on page no 17 varied from the title mentioned on course structure.

Thanks and Regards
Mamta Choudhary
Head, DMS

Fwd: Syllabus BA 2022 NEP final.pdf

Inbox

Dr. Shams Kamal Anjum
to me

4:58 PM (0 minutes ago)

---------- Forwarded message ---------
From: **Dr. Anjum** <anjumdr@gmail.com>
Date: Wed, Sep 14, 2022, 8:42 AM
Subject: Re: Syllabus BA 2022 NEP final.pdf
To: Dr. Shams Kamal Anjum <arabicbgsbu@gmail.com>

Thanks for sharing. The syllabus is OK. It's a meticulously prepared and nicely drafted document. However, keeping in view the emphasis of NEP on regional languages and SOCIAL scenario of PP, it will be appreciable if Gojri and Pahari is introduced as major/minor subject in place of AEC (further providing catchment for PG GOJRI AND PAHARI!!

Regards
Dr. Rafique Anjum
Coordonator CRGPKL
BGSBU

Department of Management Studies
Baba Ghulam Shah Badshah University
Rajouri, J&K 185234, INDIA

Reference No:BGSBU/MGSMS22/3051

Dated: 20-09-2022

Minutes of the meeting of Board of Studies

A meeting of Board of Studies for BBA Programme in line with NEP 2020 was convened in the Conference Hall, Department of Management Studies on 09-09-2022 at 2:30 pm. Prof. Mushtaq Ahmad Darzi from the Department of Management Studies, University of Kashmir, Srinagar was an external expert and joined through online mode. Besides, the following faculty members of the Department of Management Studies were also present in the meeting:

Name of the faculty members

1.	Dr. Parvez Abdulla	Internal Member
2.	Dr Radha Gupta	Internal Member
3.	Dr Gourav Seghal	Internal Member
4.	Dr Darshaka Anjum	Internal Member
5.	Dr Javed Iqbal	Internal Member
6.	Dr.Jatinder Kumar	Internal Member
7.	Dr Aasim Mir	Internal Member
8.	Dr. Kafeel Ahmed	Internal Member
9.	Dr Danish Iqbal Raina	Internal Member
10.	Dr. Vinay Kumar	Internal Member

The meeting commenced with warm welcome of the external expert Prof. Mushtaq Ahmad Darzi by the Head, Department of Management Studies. She expressed her thanks to the expert for having spared time to go through the scheme and syllabus of BBA for first two semesters in line with NEP referred to him. Thereafter, the agenda was taken up for the discussion.

The following specific recommendations were received from the expert:

1. For Major course offered in 1st semester, Management Principles and Practices with course code BBA-MJ-101, it was resolved that the word 'definition' must be omitted in unit 1 as the conceptual framework covered the same as well.
2. For minor course offered in 1st semester, Fundamental of Accounting (BBA-MR-102), it was suggested that Unit 1 and 2 should be clubbed. It was also suggested that there is no need to elaborate Principles of accounting, instead writing Generally Accepted Accounting Principles (GAAP) is sufficient. Further, it was suggested that Unit 3 must be shifted to unit 2 and unit 4 must be shifted to unit 3. Also, it was suggested that the topic pertaining to specific journal must be incorporated.

3. The expert further suggested that topics like depreciation accounting, causes, need for charging depreciation, factors affecting the amount of depreciation, methods of calculating depreciation and accounting treatment will be unit 4 of the course Fundamentals of Accounting.

4. For major course offered in 2nd Semester, Organizational Behavior (BBA-MJ-201), it was suggested that in Unit 5, the topic motivation must be discarded due to its repetition in 1st semester course entitled Management Principles and Practices. It was also suggested that it must be replaced with organizational change. However, it was suggested that proposed topic of organizational effectiveness in this unit must be retained.

5. For minor course of 2nd semester, Managerial Economics (BBA-MR-202) it was suggested that forecasting of demand must be included.

6. For the ability enhancement course of 2nd semester, Business Statistics (BBA-AI-204), it was suggested that rank correlation coefficient must be included in unit 4.

7. It was suggested by the expert that for all the courses, books must be recommended with the name of their publishers.

Further, the following points were also deliberated upon and resolved as under:

8. The issue related to adoption of new Scheme and syllabus for BBA programme as per NEP-2020 was discussed thoroughly. It was resolved to adopt Scheme and syllabus of first and Second semester along with exit points at different levels, credit calculation, and curriculum mix for various components as per guidelines of NEP. The exit levels include certificate after one year, diploma after two year, graduation degree after successful completion of three years and Graduation with Honors after completion of fourth year. It was also discussed and resolved in the meeting that the exit option after 3 year should be named as three year degree and exit option after 4 year as undergraduate degree with honours and honours with research.

9. Following Credit Plan of the four year BBA program under NEP 2020 was resolved:
   1 Year Certificate (minimum 40 credits)
   2 Year Diploma (minimum 80 credits)
   3 Year Degree (120 credits)
   4 Year Degree (160 credits)

10. It was resolved that student will choose **Major Course** from the discipline of Business Administration and will study for

a) 62 credits in major for three year graduation
b) 94 credits in major for four year graduation(Honours)
c) 82 credits in major for four year graduation (Honours) with research

And for **Minor Course** each student will study:

a) 24 credits of Minor course for Three Year Graduation from 1st to 6th semester (4 Credits in each Semester)
b) 32 Credits of Minor in same subject for Four Year Graduation (Honors)

For **Multidisciplinary Courses** from other disciplines (Foundation Courses), student will study:

9 Credits of Multidisciplinary Courses of 03 credits each from 1st to 3rd semesters from disciplines other than Major and Minor.

For **Ability Enhancement Course**, student will study:
9 Credits of Ability enhancement Courses of 3 Credits each from 1st to 3rd Semester.

For **Skill Enhancement Courses**, student will study:

6 credits of Skill Enhancement Courses of 2 Credits each from 1st to 3rd Semester

For **Value Added Courses** (Compulsory Courses), student will study 4 credits courses comprising of 2 courses in each 1st and 2nd Semester

(a) Understanding India (b) Environmental Science and Education
(c) Digital Technology (d) Health and Wellness

And for Value Added Courses (Optional Courses), student will study 2 credits courses in each 3rd and 4th Semester.

(a) Community Engagement (b) National Cadet Corp (NCC)
(c) National Service Scheme (NSS) (d) Sports
(e) Cultural (f) Yoga Education

It was also resolved that each student will be required to undergo 2 credits of internship in 5th semester and students pursuing Under Graduate Degree with research shall be required to undergo a Research Project/Dissertation of 12 credits in 8th semester.

11. Besides major course, minor course, ability enhancement course, skill enhancement course and value added courses, It was resolved that students will opt any one subject of his/her choice of Interdisciplinary nature.

12. It was further resolved that the detailed course structure, credit allocations and syllabus submitted for BBA for first two semesters is in line with NEP and should be applicable from the academic session 2022. Moreover, It was also resolved that the course structure and detailed syllabus of the courses to be offered in 4 years BBA degree programme from 2nd semester onwards must be submitted soon for the discussion and further needful.

13. It was resolved to adopt the following instructions for paper setting:

For 4 credit courses: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 10 long answer type questions, two from each unit. The students will be required to answer 05 questions, one from each unit, each question carries 10 marks. The internal assessments for 4 credit course will be 40.

For 3 credit courses: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 09 objective-cum-short answer type questions, covering entire four units, each carrying 01 mark. **Section B** will contain 08 long answer type questions, two from each unit. The students will be required to answer 04 questions, one from each unit, each question carries 09 marks. The internal assessments for 3 credit course will be 30.

For 2 credit courses: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The internal assessments for 2 credit course will be 20.

14. The issue pertaining with breakup between External & Internal examination under the head SEE-Semester End Examination and CCE-Comprehensive & Continuous Evaluation respectively as per the number of credits was also discussed and following was resolved:

Number of Credits	Total	SEE-Semester End Examination	CCE-Comprehensive & Continuous Evaluation	Total Contact Hours
4 Credit	100	60	40	60
3 Credit	75	45	30	45
2 Credit	50	30	20	30

Further, the credit wise internal breakup was also discussed and following was resolved:

Number of credits	Comprehensive & Continuous Evaluation	CCE Breakup
4 Credit	40	a) 16 Marks - Term Paper. b) 14 Marks -Presentation/ Viva/Assignment. c) 10 Marks - Classroom Attendance.
3 Credit	30	a) 12 Marks - Term Paper. b) 10.5Marks -Presentation/ Viva/Assignment. c) 7.5 Marks - Classroom Attendance
2 Credit	20	a) 8 Marks - Term Paper. b) 7 Marks - Presentation/ Viva/assignment. c) 5 Marks - Classroom Attendance.
		Attendance Breakup Below 75 percentage =Shortage 76-80 =40% 81-85 =60% 86-90 =80% 91 and above 100%

Also, it was resolved that the pass percentage in both the components must be remained same as per the past practices followed by the University.

Department of Management Studies
Baba Ghulam Shah Badshah University
Rajouri, J&K 185234, INDIA

Apart from the above, it was also resolved that the internal component must be kept flexible and will remain at the discretion of the teacher and it should be a continuous assessment. It was also resolved that only those students will be eligible for appearing in the final examination who will qualify the internal assessment component. It was also resolved that 25% of the internal components will be assigned to the marks for classroom attendance.

Finally, all the suggestions and recommendations made were incorporated at the appropriate places and were submitted and subsequently approved.

At the end of the meeting, external expert Prof. Mushtaq Ahmed Darzi appreciated the Department of Management Studies for putting their efforts in framing the structure and syllabus of BBA programme as per NEP 2020 guidelines.

The meeting ended with vote of thanks by the Head, Department of Management Studies.

Internal Members

1. Dr. Parvez Abdulla
2. Dr Radha Gupta
3. Dr Gaurav Seghal
4. Dr. Darshaka Anjum
5. Dr. Javed Iqbal
6. Dr.Jatinder Kumar
7. Dr. Aasim Mir
8. Dr. Kafeel Ahmed
9. Dr. Danish Raina
10. Dr.Vinay Kumar

Prof. Mushtaq Ahmad Darzi
(External Expert)

Dean/Chairman BoS
School of Management Studies

Head
Department of Management Studies

BOS - 2022

BGSBU

Pervez Alam <pervez@bgsbu.ac.in>

Fwd: Syllabus Civil Engineering

1 message

Shabina Nazir <shabinanazir.2011@gmail.com> Fri, Sep 16, 2022 at 11:07 AM
To: "ahusain3@jmi.ac.in" <ahusain3@jmi.ac.in>, pervez@bgsbu.ac.in

Sir,

Good Evening,

The Hon'ble Vice Chancellor of Baba Ghulam Shah Badshah University has appointed you as Expert member for Board of Studies for B. Tech Programme in the Department of Civil Engineering. We are grateful to you for helping the University in framing the syllabi for the aforesaid programme which will be taught to the students admitted in the Academic Year 2022. Furthermore, as per our telephonic conversation kindly find attached herewith the soft copy of the draft syllabi from 1st to 8th semesters along with course curriculum which is being sent to you for your valuable inputs and suggestions.

Looking forward to your cooperation.

with regards

Shabina Nazir
Deputy Registrar
Academic Affairs
BGSB University
Rajouri - 185234 (J&K)
Ph. No. 9419171665
Email: shabinanazir.2011@gmail.com

Civil Latest updated syllabus 2022.pdf
1185K

Co-ordinator
Dept. of Civil Engineering
School of Engineering & Tech

BGSBU

Pervez Alam <pervez@bgsbu.ac.in>

Fwd: Regarding Comment of the syllabus

1 message

Pervez Alam <pervez@bgsbu.ac.in> Wed, Nov 29, 2023 at 10:39 AM
To: SHAHID UL ISLAM <shahidiitr@gmail.com>

---------- Forwarded message ---------
From: **Shabina Nazir** <shabinanazir.2011@gmail.com>
Date: Mon, 3 Oct 2022, 20:15
Subject: Fwd: Regarding Comment of the syllabus
To: <pervez@bgsbu.ac.in>

---------- Forwarded message ---------
From: **Prof. Azhar Husain (D/o Civil Engineering)** <ahusain3@jmi.ac.in>
Date: Mon, 3 Oct, 2022, 6:29 pm
Subject: Regarding Comment of the syllabus
To: <shabinanazir.2011@gmail.com>

Dear Madam,

I would like to express my gratitude to the Honorable Vice Chancellor for having confidence in me to serve as an academic expert on the Board of Studies for the Civil Engineering Department. The received syllabus has been carefully drafted, and it incorporates all of the most recent papers that are required by the Gate and IES syllabuses. Having said that, the following recommendations could be incorporated before the implementation.
1. The paper on environmental engineering can be broken up into two parts, which will be referred to as Environmental Engineering-1 and Environmental Engineering-II respectively.
2. In light of the results of recent experiments, the course outline for the Geotechnical Laboratory might be revised.
3. Carefully review the entirety of the course outline to ensure that all of the outcomes, objectives, and other components have the same number.

Thanks and regards

Professor Azhar Husain
Department of Civil Engineering
Faculty of Engineering and Technology
JAMIA MILLIA ISLAMIA
Jamia Nagar
New Delhi

Co-ordinator
Dept. of Civil Engineering
School of Engineering & Tech.

BGSBU

Pervez Alam <pervez@bgsbu.ac.in>

Syllabus Civil Engineering

1 message

Pervez Alam <pervez@bgsbu.ac.in>
To: DR ACADEMICS <dracad@bgsbu.ac.in>, shabinanazir.2011@gmail.com

Tue, Jul 19, 2022 at 3:22 PM

Civil Latest updated syllabus 2022.pdf

Civil Latest updated syllabus 2022.pdf
1185K

Co-ordinator
Dept. of Civil Engineering
School of Engineering & Tech

School Of Engineering and Technology, BGSB University
Rajouri (J&K) – 185234

Minutes of Meeting

A meeting of syllabus revision committee was held on dated 30th March 2022 at 2PM to bring amendment in syllabus as the present life span of current syllabus expires in the year 2022. Following members participated in the revision process;

1. Prof. S.Naseem Ahmad	Professor(Retd.), JMI University
2. Mr. Vishal Puri	Head (I/C), Department of ECE
3. Mr. Mehmood-ul- Hassan	Asstt. Professor, Department of ECE
4. Mr. HaiderMehraj	Asstt. Professor, Department of ECE
5. Mr.Arshid Ahmed	Asstt. Professor, Department of ECE

Following agenda points were discussedand resolved,

1. The proforma with document of revision was placed before Prof. S. Naseem Ahmad by Mr. Mehmood-ul-Hassan (Coordinator for 1st year) for revision.
2. The proforma with document of revision was placed before Prof. S. Naseem Ahmad by Mr. HaiderMehraj (Coordinator for 2nd year) for revision.
3. The proforma with document of revision was placed before Prof. S. Naseem Ahmad by Mr. Arshid Ahmed (Coordinator for 3rd year) for revision.
4. The proforma with document of revision was placed before Prof. S. Naseem Ahmad by Mr. Vishal Puri (Coordinator for 4thyear) for revision.

The faculty members of department of ECE were entrusted with the job of revision in various courses. The departmental core committee collected all the revision documents as per the annexure and was placed before esteemed professor for approval. The various inputs from meeting on revision is attached as Annexure -1.

30/03/22

31/3/22

31/03/22

School Of Engineering and Technology, BGSB University
Rajouri (J&K) – 185234

The meeting concluded with information from chair to revise all Cos of subjects in order to meet various requirement criteria for accreditation.

30/3/22
Prof. S. Naseem Ahmad

31/3/22
Mr. Vishal Puri

Mr. Mehmood-ul- Hassan

31/03/22
Mr. HaiderMehraj

Mr. Arshid Ahmed

Head
Department of ECE
BGSB University Rajuori
(Head, ECE)
31/3/22

School Of Engineering and Technology, BGSB University
Rajouri (J&K) – 185234

Suggestions from External Academic Expert on Course Revision

Annexure -1

Following suggestions were proposed by Prof. Naseem Ahmad regarding the course revision

1. That the Short Channel effects be removed from the Course of basic electronics Unit5 as it would be too advanced for 1st sem students at this level.
2. Basic concept regarding Feedback amplifiers and oscillators be introduced in Basic Electronics.
3. Course Outcomes be revised in a way so that they yield maximum CO-PO Mappping.
4. All the course contents of subject **Measurements and Instrumentation** be selected from the Book D.COOPER the emphasis should be on electronic instrumentation.
5. Advanced concepts on Audrino, Raspberry Pi and PIC microcontrollers be introduced in the subject of Microcontrollers keeping in view that course should not become heavily loaded for students.
6. Rest most of the subject contents were found up to date that required no further changes.

Prof. S. Naseem Ahmad 30/3/22

Mr. Vishal Puri 31/3/22

Mr. Mehmood-ul- Hassan

Mr. HaiderMehraj 31-3-22

Mr. Arshid Ahmed

Head, ECE

Head
Department of ECE,
BGSB University, Rajouri

School Of Engineering and Technology, BGSB University
Rajouri (J&K) – 185234

Minutes of Meeting

An Invitation was sent to Mr. Aaqlb Bulla, Senior Engineer, Qualcomm, Bangalore on 25th May 2022 to review syllabus of ECE department as an Industrial expert. Mr. Aaqib Bulla accepted the invitation and suggested Important changes for discussion. A online meeting with Mr. Aaqib Bulla, Senior Engineer, Qualcomm was arranged on dated 2nd June 2022 for discussions with ECE core committee members for syllabus revision.The meeting was attended by,

1. Mr. Aaqib Bulla — Industry Expert, Senior Engineer,Qualcom
2. Mr. Vishal Puri — Head (I/C), Department of ECE
3. Mr. Mehmood –ul -Hassan — Assistant Professor, Department of ECE
4. Mr. HaiderMehraj — Assistant Professor, Department of ECE
5. Mr. Arshid Ahmed — Assistant Professor, Department of ECE

Following agenda points were discussed and resolved,

1. As suggested by expert it was resolved that brief introduction to 5G will be introduced in the syllabus of Advanced 3G and 4G Wireless & Mobile Communication course and the same will be incorporated in syllabus.
2. Addition of AMBA (Advanced Microcontroller Bus Architecture) in the Micro-Controller and Embedded Systemswas proposed by expert keeping industry perspective into account and the same will be incorporated in revised syllabus.
3. A need was felt for introducing seminar for students at initial semesters in order to make students prepare for latest research/technological areas through seminar. The suggestion was incorporated with change in nomenclature from Industrial Training to Industrial Training – I & Seminar in 5th semester.

School Of Engineering and Technology, BGSB University
Rajouri (J&K) – 185234

The meeting concluded with vote of thanks from Mr. Arashid Ahmed, Assistant Professor,Department of ECE.

Mr. Aaqib Bulla
Senior Engineer, Qualcomm

Mr.Mehmood-ul-Hassan
Asstt. Professor, ECE

Mr. HaiderMehraj
Asstt. Professor, ECE

Mr. Arshid Ahmed
Asstt. Professor, ECE

Mr. Vishal Puri
Head
Department of ECE

DEPARTMENT OF ELECTRICAL ENGINEERING
School Of Engineering And Technology, BGSB University
Rajouri (J&K) – 185234

Ref. No. BGSBU/SOET/EE/22/272 Dated: 06-10-2022

The Deputy Registrar
BGSBU, Rajouri

Sub: - Revised B.Tech Electrical Engineering Syllabus

R/Madam,

With reference to your letter no. BGSBU/Acad/22/217 dated 26-09-2022, I would like to inform your goodself that the necessary suggestions suggested by experts are incorporated in the revised syllabus after discussing with departmental faculty members.

Thank You

Head EE
Electrical Engineering
SoET, BGSBU

Enclosures attached

(i) Hardcopy of Revised Syllabus

O.C

06/10/2022

Tel: 9419154432, e-mail: headee@bgsbu.ac.in, visit us at: www.bgsbu.ac.in

BGSBU/E-1/22/671
27/9/22

Baba Ghulam Shah Badshah University
Rajouri - 185234 (J&K)

The Dean
Schools of Engineering & Technology
BGSB University
Rajouri

No.:BGSBU/Acad/22/217
Dated: 26-09-2022

Sir,

Kindly find attached herewith the comments received from the Academic expert and Industrial expert appointed for the Board of Studies in ***B. Tech. Electrical Engineering programme*** which are being sent to you for further necessary action at your end. Kindly send the revised syllabi with a letter stating that the suggestions suggested by the expert have been discussed with the faculty members in the departmental meeting and have been incorporated in the revised syllabi, at the earliest for seeking approval of Competent Authority.

Thanking you,

Yours faithfully,

26/09/2022

Deputy Registrar
(Academic Affairs)

Head EE for n.a.
27/9/22

EE - Academic Expert

11:45 AM

Shabina Nazir <shabinanazir.2011@gmail.com>

Gmail

(no subject)

Mon, Aug 29, 2022 at 4:51 PM

Dr Sheikh Javed Iqbal <jvd@nitsri.ac.in>
To: Shabina Nazir <shabinanazir.2011@gmail.com>

Ms Sanina Nazir,
Deputy Registrar (Academic Affairs),
BGSB Univeersity, Rajouri, J & K.

Madam,

Please find attached herewith the suggestions regarding the course scheme of B Tech Electrical Engineering offered by your University. In view of the suggestions, the modified course scheme is also attached. In additions to the proposed changes in the course scheme, the following be considered for finalizing the course scheme and syllabus of each course:

- The syllabus be distributed uniformly between different units of each course.
- The course objectives and course outcomes be well-articulated.
- Correct nomenclature and of Standard/ suitable terminology be used throughout the document.

Correct course names as per the attached modified course scheme be used.

- In view of the proposed changes, course number of some courses will need to be changed.
- The document be thoroughly checked for typos and other formatting and semantic errors.

Some illustrations where the syllabi of some courses need corrections/ modifications are:

1. "Basic Electrical Engineering":
Unit-V: Components of LT Switchgear may be removed.
2. List of experiments in "Engineering Physics Lab" is too long and may be curtailed.
3. Power Systems I:
Unit-I appears too lengthy and involves too many topics - may need to be shortened.
Unit III may be renamed as "Line Parameter Calculations".
4. The list of experiments in "Power Electronics and Electric Drives Lab" is not relevant – may be corrected.

Dr Sheikh Javed Iqbal
Associate Professor,
Department of Electrical Engineering,
NIT Srinagar

[Quoted text hidden]

2 attachments

B Tech Course Scheme Proposed Changes.pdf
79K

Modified Course Scheme.pdf
150K

Suggestions regarding Course Scheme/ Syllabus for B. Tech. Electrical Engineering
Offered by

Department of Electrical Engineering, School of Engineering & Technology,
Baba Ghulam Shah Badshah University, Rajouri (J&K)-18523

1st Semester

1. As a general rule, 2 lab hours is equal to 1 credit. Accordingly, workshop practices should have one credit instead of two credits.

2nd Semester

1. "C Programming" and "C Programming lab" may be removed and added as Open Elective at 3rd semester level.
2. LTP for "Basic Electronics" be changed to 3-1-0 instead of 2-1-0.
3. "Engineering Graphics Lab" may be renamed as "Engineering Drawing".

3rd Semester

1. "Electromagnetic Wave Theory" may be renamed as "Electromagnetic Fields and Waves".
2. "Engineering Material Science" may be named as "Electrical Engineering Materials" and made a Core Course in place of "Professional Elective Course I".
3. "Power Engineering" and "Industrial Electrical Systems" are too advanced to be floated at 3rd semester. May be shifted to 6th semester and included as Professional Electives.
4. "Disaster Preparedness and Planning" may be shifted to 5th semester and added as "Open Elective Course III".
5. "C Programming" and "C Programming lab" shifted from 2nd semester be added as "Open Elective Course I".
6. "Data Structures using C" and "Data Structures using C lab" at 3rd semester level may be swapped with "Python Programming" and "Python Programming lab" at 4th semester level.
7. "Introduction to Fluid Mechanics" may be renamed as "Fluid Mechanics" and shifted to 4th semester as "Open Elective Course II". "Fluid Mechanics Lab" be also shifted to 4th Semester.

4th Semester

1. "Biosciences" may be removed and added at 5th semester level as "Open Elective Course III".
2. LTP of Renewable Energy Sources be changed to 3-1-0 instead of 3-0-0.
3. "Linear Integrated Circuits & Pulse Switching" may be removed as "Open Elective Course II" as most of its contents are covered in the "Applied Electronics" at 5th semester level.
4. "MATLAB" may be renamed as "Computer-Aided Simulations Lab".
5. "Data Structures using C" and "Data Structures using C lab" at 3rd semester level may be swapped with "Python Programming" and "Python Programming lab" at 4th semester level.
6. "Introduction to Fluid Mechanics" shifted from 3rd semester and renamed as "Fluid Mechanics" be included as "Open Elective Course II". "Fluid Mechanics Lab" be also shifted to 4th Semester.

5th Semester

1. "Electrical Measurements II" may be shifted to 6th Semester. "Electrical and Electronic Measurements Lab" be renamed as "Electrical Measurements Lab" and shifted to 6th semester.
2. "Signals and Systems" may be shifted from 6th semester to 5th semester.
3. "Disaster Preparedness and Planning" shifted from 3rd semester be added as "Open Elective Course III".
4. "Biosciences" shifted from 4th semester be added as "Open Elective Course III".
5. "Industrial Electronics" be removed as "Open Elective Course III". "Power Electronics" is prerequisite for this course which is offered at 6th semester level. Moreover, most of its contents are included in "Electric Drives" floated at 7th semester level.
6. "Biomedical Instrumentation" floated as Open Elective be shifted to 7th semester and included as Professional Elective.

6th Semester

1. "Electrical Measurements II" and "Electrical Measurements Lab" shifted from 5th Semester be included in 6th semester. "Signals and Systems" may be shifted to 5th semester.
2. "Professional Elective Course II" be renamed as "Professional Elective Course I"
3. "Energy Economics and Planning" be removed as "Professional Elective Course" as this course is repeated in 7th semester.
4. "Design of Power Apparatus" floated as "Professional Elective" be renamed as "Design of Electric Machines" and included as "Core Course" at 7th semester level.
5. "Power Engineering" and "Industrial Electrical Systems" shifted from 3rd semester be included as Professional Elective.

7th Semester

1. "Design of Power Apparatus" shifted from 6th semester and renamed as "Design of Electric Machines" be included as "Core Course" with LTP of 3-0-0.
2. "Biomedical Instrumentation" shifted from 5th semester be included as Professional Elective.
3. "Professional Elective Course III" be renamed as "Professional Elective Course II"

8th Semester

1. "Professional Elective Course IV" and "Professional Elective Course V" be renamed as "Professional Elective Course III" and "Professional Elective Course IV", respectively.

Dr Sheikh Javed Iqbal
Associate Professor,
Department of Electrical Engineering,
NIT Srinagar

Centre for Research in Gojri, Pahari & Kashmiri Languages
SCHOOL OF ISLAMIC STUDIES & LANGUAGES
Baba Ghulam Shah Badshah University
Rajouri, Jammu & Kashmir - 185234
Website:www.bgsbu.ac.inE-mail: drl@bgsbu.ac.in

Minutes of the Meeting

The meeting of the Board of Studies in M.A. Gojri & Pahari under School of Islamic Studies & Languages, was convened today on 12th of August, 2022 in the Office Chamber of Dean Academic Affairs, BGSBU, under the chairmanship of Prof. Iqbal Parwez, Dean Academic Affairs.

The following were present

1. *Prof. Iqbal Parwez, Dean Academic Affairs, BGSBU*
2. *Dr. Md. Rafique Anjum, Coordinator, PG Programme in Gojri & Pahari*
3. *Dr. Layaqat Nayyar, Coordinator, Department of Urdu BGSBU*
4. *Dr. Mohd Asaf Malik, Assistant Professor, Department of Urdu BGSBU*

The agenda of the meeting was to discuss the expert opinions of the following external members received by respective emails and give final touches to the Syllabus for MA Gojri& Pahari, that had already been circulated among the board members. Following were the expert members nominated by Hon'ble Vice Chancellor, BGSBU:

- *Prof. Quddus Javed, Ex-Professor & Head Department of Urdu Central University of Kashmir.*
- *Dr. Mirza Khan Waqar, Retd. Principal & Gojri Scholar*
- *Dr. Abdul Haque Nayeemi, Asstt. Prof. Department of Urdu PG College Rajouri*
- *Sh. Nisar Hussain Rahi, Retd. Principal & Pahari Scholar*

At the outset The Chairman, welcomed the members and thanked the external members Prof. Quddus Javed, Dr. Mirza Khan Waqar, Dr. Abdul Haque Nayeemi and Sh. Nisar Hussain Rahi for their valuable inputs. He especially thanked Prof. Quddus Jawaid the eminent Urdu Scholar & former Head, Department of Urdu, University of Kashmir for guiding the Board of Studies in Gojri& Pahari in formulation of the first-ever Syllabus for PG Programme in Gojri& Pahari at BGSBU. He also discussed the UGC guideline on framing syllabi and the special stress of NEP-2020 on promotion of regional languages in institutions of higher learning. He appreciated the efforts put in by the Coordination Committee of CRGPKL for preparing the draft of Syllabus for MA in Gojri& Pahari and placing it before the Board of Studies for detailed deliberations and suggestions.

Prof. Quddus Jawaid, the external expert had (through mail) expressed his gratitude to the Competent authority for having invited him to share his experience and expertise in the field of language and literature and also for taking lead in introduction of PG Programme in Gojri& Pahari at BGSBU Rajouri. He had expressed satisfaction over the course structure and distribution of credits. The other members had also expressed satisfaction over the courses in each semester and shared their inputs for refinement and upgradation of contents wherever necessary. After fruitful discussions and feedback of members present in

the meeting, the syllabus was finalised with a view to make it compatible with the contemporary academic needs with special focus on thrust areas.

The board, unanimously resolved in concurrence to the external expert members to adopt the syllabus as appended herewith for the Academic sessions 2022 – 2024. The Board also agreed upon the Eligibility for admission in M.A. Gojri & Pahari as Graduation in any discipline from a recognised university, with allowing flexibility in Medium of instruction and language to be used in answering the question papers.

The meeting ended with thanks to the chair.

Signatories:

Dr. Layaqat Hussain Nayyar
Member

Dr. Mohd Asaf Malik
Member

Dr. Md. Rafique Anjum
Programme Coordinator, M.A. Gojri & Pahari

Prof. Iqbal Parwez
Dean Academic Affairs BGSBU

Baba Ghlam Shah Badshah University
Rajouri - 185234 (J&K)

University Notification No. 32 of 2022, dated: 10-10-2022

The Hon'ble Vice Chancellor, in anticipation of ratification by Academic Council, has approved the Course Structure and Syllabi of Masters Degree Programme in Gojri and Pahari from I-IV Semesters in Centre for Research in Gojri, Pahari and Kashmiri Languages under School of Islamic Studies and Languages. The validity of the above syllabi shall be for a period of 3 years w.e.f. 2022 to 2024.

Deputy Registrar
(Academic Affairs)
10/10/2022
10.10.2022

No.BGSBU/Acad/22/225
Dated:10-10-2022

Copy to:

1. Controller of Examinations
2. Dean, School of Islamic Studies and Languages
3. Coordinator, M.A. Gojri and Pahari programme
4. Special Secretary to Hon'ble Vice Chancellor for the kind information of Hon'ble Vice Chancellor
5. Deputy Controller of Examinations
6. All Concerned
7. Office Copy

12/10/22

O/C

10/10/2022

BGSBU

BoS Meeting held via Virtual mode.

Head CSE <headcse@bgsbu.ac.in>

Updated CSE syllabus

1 message

Head CSE <headcse@bgsbu.ac.in>
To: DR ACADEMICS <dracad@bgsbu.ac.in>

Tue, Nov 15, 2022 at 10:55 AM

Madam,
Kindly find the final copy of updated CSE syllabus from first to 8th semesters after the incorporation of suggestions given by the experts of BoS and others engineering departments.
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Thanks,

With regards,
Er. Khalil Ahmed, Assistant Professor(I/c HoD), Computer Science & Engineering.
School of Engineering and Technology
Baba Ghulam Shah Badshah University
Rajouri, Jammu & Kashmir- 185234
Mobile: 7889378152
website:www.bgsbu.ac.in

11-11-22Syllabus CSE-2022-25 .pdf
1830K

16/02/2024

BABA GHULAM SHAH BADSHAH UNIVERSITY

Rajouri-(J&K)-185131

B. Tech. Information Technology and Engineering

Syllabus I to VIII Semester

(2022 onwards)

DEPARTMENT OF INFORMATION TECHNOLOGY & ENGINEERING
SCHOOL OF ENGINEERING & TECHNOLOGY
BABA GHULAM SHAH BADSHAH UNIVERSITY
RAJOURI-(J&K)-185131

Dr. Manmeet Singh	Malik Mubasher Hassan	Nikhil Gupta	Rakesh Singh Sambyal	Prof. Asif Husain
Coordinator	(A.P., ITE)	(A.P., ITE)	(A.P., ITE)	Dean, SoET

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Coordinator

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(A.P., ITE)

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Assessment Procedure

For each theory course the total weightage is 100 marks and the assessment pattern is shown in table 1. For laboratory courses the total weightage is 50 marks and the assessment pattern is shown in table 2.

Continuous Assessment		**University Examination**	
Component	**Weightage**	**Component**	**Weightage**
Test 1	10	Written Examination	60
Test 2	10		
Assignment 1	05		
Assignment 2	05		
Attendance	10		
Total	**40**		**60**

Table 1: Distribution of weightage for theory courses.

Continuous Assessment		**University Examination**	
Component	**Weightage**	**Component**	**Weightage**
Continuous assessment of practical work, timely submission of lab records.	15	Lab experiment / procedure/ writing/ tabulation/ innovation as applicable	20
Test	05		
Attendance	05	Viva Voce	05
Total	**25**		**25**

Table 2: Distribution of weightage for laboratory courses.

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General Introduction

A. Definition of Credit

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hours Practical (Lab)/week	1 credit

B. Number of Credits needed -A total of 178 credits are needed by a student to be eligible to get Under Graduate degree in Engineering. 20% Credits may be acquired through MOOCs with in-house examination being conducted.

C. Course code and definition:

Course code	**Definitions**
BSC	Basic Science Course
ESC	Engineering Science Course
HSMC	Humanities and Social Science including Management Course
PCC-ITE	Professional Core Course
PEC -ITE	Professional Elective Course
OEC-ITE	Open Elective Course
MC-	Mandatory Course
PROJ-ITE	Project/Industrial Training

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D. Semester-wise credit cum marks distribution

S. No	Semester	Marks	Credits
1.	Semester-I	800	25
2.	Semester-II	750	22
3.	Semester-III	775	24
4.	Semester-IV	775	23
5.	Semester-V	775	24
6.	Semester-VI	750	22
7.	Semester-VII	725	23
8.	Semester-VIII	650	15
TOTAL		**6000**	**178**

E. Open and Professional Electives

Electives will be introduced in 5 threads besides the Open Elective. There are 6 slots for professional Electives and 3 slots for Open Electives. The department may permit students to take 50% of these (electives + open electives) from other disciplines, based on the choices of the students and consent of course advisers.

A. Theory

B. Systems

C. Data Science

D. Applications

E: Communications

The students will have options of selecting the electives from the different threads depending on the specialization they wish to acquire. There should be at least two electives from the open elective choices; the rest two can be taken from the other threads, if intended. On-line MOOC courses may contribute upto 20% of the credits, with in-house examination being conducted.

1. List of Professional Elective Courses

Professional Elective Course Code	Title
PEC-ITE-521	Data Analytics and Visualization
PEC-ITE-522	Compiler Design
PEC-ITE-523	Advance algorithms
PEC-ITE-621	Social Network Analysis
PEC-ITE-622	Cloud Computing

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PEC-ITE-623	Distributed Database System
PEC-ITE-624	Advanced Java Programming
PEC-ITE-625	Software Testing
PEC-ITE-626	Data Mining & warehousing
PEC-ITE-721	Software Project Management
PEC-ITE-722	Computer Based Numerical Techniques
PEC-ITE-723	Bio Metrics and Network security
PEC-ITE-724	Artificial Intelligence
PEC-ITE-725	Linux Administration
PEC-ITE-821	Real Time Operating System
PEC-ITE-822	Big Data Analytics
PEC-ITE-823	Distributed Systems
PEC-ITE-824	Wireless Networks
PEC-ITE-825	Deep Learning
PEC-ITE-826	Security and Privacy

2. List of Open Elective Courses

Open Elective Course Code	Title
OEC-ITE-521 / PCC-CE-524	Concrete Technology
OEC-ITE-522 / PEC-CSE-722	Internet of Things
OEC-ITE-523 / PCC-ECE-325	Electronic Measurements and Instrumentation
OEC-ITE-524 / PEC-EE-322	Power Engineering
OEC-ITE-621 / PEC-ECE-621	Mobile and Wireless Communication
OEC-ITE-622 / PEC-CSE-826	Neural Networks
OEC-ITE-623 / PEC-EE-421	Renewable Energy Sources
OEC-ITE-624 / PEC-ECE-623	Antenna and Wave Propagation
OEC-ITE-721 / PCC-CE-522	Environmental Engineering
OEC-ITE-722 / PCC-ECE-522	Communication system
OEC-ITE-723 / PEC-ECE-727	Optical Communication

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Guidelines for Project-I/Project-II/Industrial training

Project I

The object of Project Work I is to enable the student to take up investigative study in the broad field of Information Technology Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. The assignment to normally include:

1. Survey and study of published literature on the assigned topic;
2. Working out a preliminary Approach to the Problem relating to the assigned topic;
3. Conducting preliminary Analysis/ Modeling/ Simulation/ Experiment/Design/ Feasibility;
4. Preparing a Written Report on the Study conducted for presentation to the Department;
5. Final Seminar, as oral Presentation before a departmental committee.

Project II

The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up under ITE Project-I, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

1. In depth study of the topic assigned in the light of the Report prepared.
2. Review and finalization of the Approach to the Problem relating to the assigned topic. Preparing an Action Plan for conducting the investigation, including team work.
3. Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed.
4. Final development of product/process, testing, results, conclusions and futuredirections.
5. Preparing a paper for Conference presentation/Publication in Journals, if possible.
6. Preparing a Dissertation in the standard format for being evaluated by theDepartment.
7. Final Seminar Presentation before a Departmental Committee.

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Summer internship/Industrial training

Minimum of six weeks in an Industry in the area of Information Technology Engineering. The summer internship should give exposure to the practical aspects of the discipline. In addition, the student may also work on a specified task or project which may be assigned to him/her. The outcome of the internship should be presented in the form of a report.

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Semester-I

Course Code	Title	Scheme of Exam				Hrs./Week			Credits
		Duration (Hrs.)	IA	UE	Total Marks	L	T	P	
BSC-ITE-121	Mathematics-I	3	40	60	100	3	1	0	4
BSC-ITE-122	Engineering Chemistry	3	40	60	100	3	1	0	4
BSC-ITE-123	Engineering Physics	3	40	60	100	3	1	0	4
ESC-ITE-121	Basic Electrical Engineering	3	40	60	100	3	0	0	3
ESC-ITE-122	Computer Fundamentals	3	40	60	100	3	0	0	3
MC-ITE-121	Environmental Science *	3	40	60	100	2	0	0	-
Total			**200**	**300**	**500**				**18**
Laboratory Courses									
BSC-ITE-131	Engineering Chemistry Lab	2	25	25	50	0	0	2	1
BSC-ITE-132	Engineering Physics Lab	2	25	25	50	0	0	2	1
ESC-ITE-131	Basic Electrical Lab	2	25	25	50	0	0	2	1
ESC-ITE-132	Engineering Graphics **	3	40	60	100	1	0	4	3
ESC-ITE-133	Computer Fundamentals Lab	2	25	25	50	0	0	2	1
MC-ITE-131	Induction Program	-	-	-	-	-	-	-	-
Total			**140**	**160**	**300**				**7**
Total (Theory + Lab)			**340**	**460**	**800**	**Total Credits**			**25**

Note:

1. * Environmental science course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks.
2. ** The examination pattern of Engineering Graphics Lab shall be same as of other theory courses.
3. Induction training is also non-credits and the student has to get at-least qualifying attendance to qualify the subject. The student has to qualify this course by attending the training which will be verified by concerned teacher.

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Semester-II

Course Code	Title	Scheme of Exam				Hrs./Week			Credits
		Duration (Hrs.)	IA	UE	Total Marks	L	T	P	
BSC-ITE-221	Mathematics-II	3	40	60	100	3	1	0	4
ESC-ITE-221	Basic Electronics (ECE)	3	40	60	100	3	0	0	3
ESC-ITE-222	Engineering Mechanics	3	40	60	100	3	0	0	3
ESC-ITE-223	C Programming	3	40	60	100	3	1	0	4
HSMC-ITE-221	Communication Skills	3	40	60	100	2	0	0	2
MC-ITE-221	Indian Constitution *	3	40	60	100	2	0	0	-
Total			**200**	**300**	**500**				**16**
Laboratory Courses									
HSMC-ITE-231	Communication Skills Lab	2	25	25	50	0	0	2	1
ESC-ITE-231	Basic Electronics Lab	2	25	25	50	0	0	2	1
ESC-ITE-232	Engineering Mechanics Lab	2	25	25	50	0	0	2	1
ESC-ITE-233	C Programming Lab	2	25	25	50	0	0	4	1
ESC-ITE-234	Workshop Practice	2	50	0	50	0	0	2	2
Total			**150**	**100**	**250**				**6**
Total (Theory + Lab)			**350**	**400**	**750**	**Total Credits**			**22**

Note:

1. * Indian constitution course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks

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Semester-III

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
BSC-ITE-321	Mathematics-III	3	40	60	100	3	1	0	4
PCC-ITE-321	Digital Logic Design	3	40	60	100	3	0	0	3
PCC-ITE-322	Operating System	3	40	60	100	3	1	0	4
PCC-ITE-323	Data Structure using C++	3	40	60	100	3	0	0	3
PCC-ITE-324	Object Oriented Programming using Java	3	40	60	100	3	0	0	3
HSMC-ITE-321	Human Values and Professional Ethics	3	40	60	100	3	0	0	3
Total			**240**	**360**	**600**	-	-	-	**20**
Laboratory Courses									
PCC-ITE-331	Data Structures using C++ Lab	2	25	25	50	0	0	2	1
PCC-ITE-332	Object Oriented Programming using Java Lab	2	25	25	50	0	0	2	1
PCC-ITE-331	Digital Logic Design Lab	2	25	25	50	0	0	2	1
PROJ-ITE-331	Capstone Project -I	-	25	-	25	0	0	4	1
Total			**100**	**75**	**175**	-	-	-	**4**
Total (Theory + Lab)			**340**	**435**	**775**	**Total Credits**			**24**

Note:

1. * The capstone project is a unique opportunity to carry out independent group research in order to devise an innovative solution for a real-world problem.

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Semester-IV

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
PCC-ITE-421	Database Management System	3	40	60	100	3	0	0	3
PCC-ITE-422	Computer Organization & Architecture	3	40	60	100	3	0	0	3
PCC-ITE-423	Design & Analysis of Algorithms	3	40	60	100	3	1	0	4
PCC-ITE-424	Discrete Mathematics	3	40	60	100	3	0	0	3
PCC-ITE-425	Computer Networks	3	40	60	100	3	0	0	3
PCC-ITE-426	Python Programming	3	40	60	100	3	0	0	3
Total			**240**	**360**	**600**				**19**
PCC-ITE-431	Python Programming Lab.	2	25	25	50	0	0	2	1
PCC-ITE-432	Database Management System Lab.	2	25	25	50	0	0	2	1
PCC-ITE-433	Computer Networks Lab	2	25	25	50	0	0	2	1
PROJ-ITE-431	Capstone Project -II	-	25	-	25	0	0	4	1
Total			**100**	**75**	**175**	-	-	-	**4**
Total (Theory + Lab)			**340**	**435**	**775**	Total Credits			**23**

Note:

1. * The capstone project is a unique opportunity to carry out independent group research in order to devise an innovative solution for a real-world problem.

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Semester-V

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
PCC-ITE-521	Theory of Automata	3	40	60	100	3	1	0	4
PCC-ITE-522	Internet and Web Technologies	3	40	60	100	3	0	0	3
PCC-ITE-523	Software Engineering	3	40	60	100	3	0	0	3
PCC-ITE-524	Machine learning	3	40	60	100	3	1	0	4
OEC-ITE-50X	Open Elective-Course-I	3	40	60	100	3	0	0	3
PEC-ITE-50X	Professional ElectiveCourses-I	3	40	60	100	3	0	0	3
Total			**240**	**360**	**600**				**20**
Laboratory Courses									
PCC-ITE-531	Internet and Web Technologies Lab	2	25	25	50	0	0	2	1
PCC-ITE-532	Software Engineering Lab	2	25	25	50	0	0	2	1
PCC-ITE-533	Machine Learning Lab	2	25	25	50	0	0	2	1
PROJ-ITE-511	Industrial Training-I	-	25	0	25	0	0	2	1
Total			**100**	**75**	**175**				**4**
Total (Theory + Lab)			**340**	**435**	**775**	**Total Credits**			**24**

Code	Title	Type
OEC-ITE-521/ PCC-CE-524	Concrete Technology	Open Elective-I
OEC-ITE-522/ PEC-CSE-722	Internet of Things	Open Elective-I
OEC-ITE-523/ PCC-ECE-325	Electronic Measurements and Instrumentation	Open Elective-I
OEC-ITE-524/ PEC-EE-322	Power Engineering	Open Elective-I
PEC-ITE-521	Data Analytics and Visualization	Professional Elective-I
PEC-ITE-522	Compiler design	Professional Elective-I
PEC-ITE-523	Advance algorithms	Professional Elective-I

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Semester-VI

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
PCC-ITE-621	Computer Graphics & Multimedia	3	40	60	100	3	0	0	3
PCC-ITE-622	Cryptography & Network Security	3	40	60	100	3	0	0	3
PCC-ITE-623	Unix/Linux & Shell Programming	3	40	60	100	3	1	0	3
OEC-ITE-62X	Open Elective Courses-II	3	40	60	100	3	0	0	3
PEC-ITE-62X	Professional Elective Courses-II	3	40	60	100	3	0	0	3
PEC-ITE-62X	Professional Elective Courses-III	3	40	60	100	3	0	0	3
Total			**240**	**360**	**600**				**18**
Laboratory Courses									
PCC-ITE-631	Computer Graphics & Multimedia Lab	2	25	25	50	0	0	2	1
PCC-ITE-632	Unix/Linux & Shell programming Lab	2	25	25	50	0	0	2	1
PROJ-ITE-631	Minor Project	-	50	0	50	0	0	4	2
Total			**100**	**50**	**150**				**4**
Total (Theory + Lab)			**340**	**410**	**750**	**Total Credits**			**22**

Code	Title	Type
OEC-ITE-621 /PEC-ECE-621	Mobile and Wireless Communication	Open Elective-II
OEC-ITE-622 /PEC-CSE-826	Neural Networks	Open Elective-II
OEC-ITE-623 /PEC-EE-421	Renewable Energy Sources	Open Elective-II
OEC-ITE-624 /PEC-ECE-623	Antenna and Wave Propagation	Open Elective-II
PEC-ITE-621	Social Network Analysis	Professional Elective -II/III
PEC-ITE-622	Cloud Computing	Professional Elective-II/III
PEC-ITE-623	Distributed Database System	Professional Elective-II/III
PEC-ITE-624	Advanced Java Programming	Professional Elective-II/III
PEC-ITE-625	Software Testing	Professional Elective-II/III

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PEC-ITE-626	Data Mining & warehousing	Professional Elective-II/III

Semester -VII

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
PCC-ITE-721	Blockchain Technologies	3	40	60	100	3	0	0	3
HSMC-ITE-721	Entrepreneurship Development & Management	3	40	60	100	3	0	0	3
OEC-ITE-72X	Open Elective Courses-III	3	40	60	100	3	0	0	3
PEC-ITE-72X	Professional ElectiveCourses-IV	3	40	60	100	3	0	0	3
PEC-ITE-72X	Professional ElectiveCourses-V	3	40	60	100	3	0	0	3
PROJ-ITE-721	Major Project Phase – I	-	100	0	100	0	0	8	4
Total			**300**	**300**	**600**				**19**
Laboratory Courses									
PCC-ITE-731	Application Development Using Android Lab.	2	25	25	50	0	0	2	1
PCC-ITE-732	Blockchain Lab	2	25	25	50	0	0	2	1
PROJ-ITE-731	Industrial Training-II	-	25	-	25	0	0	0	2
Total			**75**	**50**	**125**				**4**
Total (Theory + Lab)			**375**	**350**	**725**	**Total Credits**			**23**

Code	Title	Type
OEC-ITE-721 /PCC-CE-522	Environmental Engineering	Open Elective Courses-III
OEC-ITE-722 / PCC-ECE-522	Communication system	Open Elective Courses-III
OEC-ITE-723 /PEC-ECE-727	Optical Communication	Open Elective Courses-III
PEC-ITE-721	Software Project Management	Professional Elective-IV/V
PEC-ITE-722	Computer Based Numerical Techniques	Professional Elective-IV/V
PEC-ITE-723	Bio Metrics and Network security	Professional Elective-IV/V
PEC-ITE-724	Artificial Intelligence	Professional Elective-IV/V
PEC-ITE-725	Linux Administration	Professional Elective-IV/V

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Semester VIII

Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
PEC-ITE-82X	Professional ElectiveCourses -VI	3	40	60	100	3	0	0	3
PEC-ITE-82X	Professional ElectiveCourses-VII	3	40	60	100	3	0	0	3
PROJ-ITE-821	Major Project Phase-II	-	250	200	450	0	0	18	9
Total			**330**	**320**	**650**	**Total Credits**			**15**

Code	Title	Type
PEC-ITE-821	Real Time Operating System	Professional Elective-VI/VII
PEC-ITE-822	Big Data Analytics	Professional Elective-VI/VII
PEC-ITE-823	Distributed Systems	Professional Elective-VI/VII
PEC-ITE-824	Wireless Networks	Professional Elective-VI/VII
PEC-ITE-825	Deep Learning	Professional Elective-VI/VII
PEC-ITE-826	Security and Privacy	Professional Elective-VI/VII

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Semester-I

Course Title: Mathematics-I | **Max Marks: 100**
Course Code: BSC-ITE-121 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: The course is designed to impart elementary knowledge of theory of calculus, linear algebra and sequence & series to engineering students that will serve them to solve various engineering problems.

Unit-I: Differential Calculus

Rolle's Theorem, Mean value theorems, indeterminate forms and L'Hospital's rule; Successive differentiation and Leibnitz's theorem, Taylor's and Maclaurin's series of function of single variable, Expansion of functions of single variable.

Unit-II: Multivariable Calculus (Differentiation)

Limit, continuity and partial derivatives, physical significance of partial derivative, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

Unit-III: Integral Calculus

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV: Sequences and series

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-V Matrices (9 Lectures)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Course Outcomes: Upon the successful completion of the course, the student will be able to:

1. Understand the significance of Rolle's Theorem, Mean Value theorem, Taylor's and Maclaurin's series for differentiable functions.
2. Identify the extrema of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.

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3. Use basic the integral rules to evaluate both definite and indefinite integrals and apply the same to find areas and volume of revolutions. Apart from these, they have a basic understanding of Beta and Gamma functions.
4. Apply the tools of power series and Fourier series to deal with functions of several variables that are essentials in most branches of engineering.
5. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

TEXT BOOKS

1. **Erwin kreyszig,** Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics, Jones & Bartlett
3. **N. Piskunov,** Differential & Integral calculus, Vol-I & II.
4. **Jain &Iyengar,** Advanced Engineering Mathematics, Narosa Publishers

REFERENCE BOOKS

1. **G.B. Thomas and R.L. Finney**, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. **Veerarajan T.,** Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. **Ramana B.V.,** Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. **D. Poole**, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Semester-I

Course Title: Engineering Chemistry **Max Marks: 100**
Course Code: BSC-ITE-122 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVE: The course is designed to familiarizing the students of engineering with Water treatment, polymerization, photochemistry, corrosion and transition metal chemistry.

UNIT-1

WATER TREATMENT: Water quality measurement, Hardness of water, Estimation of hardness of water, Disadvantages of hard water, Scale and sludge formation; disadvantages, prevention and treatment, Desalination method, reverse osmosis, Electro dialysis, Domestic water treatment.

UNIT-2

POLYMERISATION: Basic concept of polymerisation, Broad classification and industrial applications (Buna-N, Buna-S, Polyester, Polyethene, Polypropene, Polystyrene,), Thermosetting plastic and its softening, Biodegradable and non-biodegradable wastes.

UNIT 3

PHOTOCHEMISTRY: Photo excitation, Luminescence and types, Norrish-I and Norrish-II reactions, Application examples of photolysis, Photosynthesis Z –Diagram, Chemistry of vision, MRI equipment and procedure of working.

UNIT-4

TRANSITION METAL CHEMISTRY: Structure of organic compounds up to coordination no 6, Isomerism (geometrical, optical, ionisation, linkage and coordination isomerism, bonding in coordination compounds by CFT, VBT. Application of coordination compounds in organic synthesis and Medical fields.

UNIT 5

CEMENT AND LIME: Introduction and types of cement, Manufacture of Portland Cement, Setting and hardening of cement, Introduction and properties of Lime, Setting and hardening of lime.

COURSE OUTCOMES: At the end of course, the student will be able to

1. Apply the methods to produce soft water for industrial use and potable water at cheaper cost.
2. Substitute metals with conducting polymers and also produce cheaper bio-degradablepolymers to reduce environmental pollution,Apply knowledge about photochemical and photo physical processes and thereactivity of excited states to explain applications in photochemical energy conversion.

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3. Understand structure of organic compounds and transition metal compound synthesis,
4. Understand the manufacturing process of cement and lime.

BOOKS RECOMMENDED:

1. **Odion G.G**-Principles of Polymerisation, John Wiley and sons.
2. **S.S Dara**-A Text Book of Engineering. Chemistry.
3. **B.Sivasankar**-Engineering Chemistry, Tata Mc Graw Hill Publication.
4. **S.Chand**-Practical Manual for Engineering Chemistry.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit

Semester-I

Course Title: Engineering Physics **Max Marks: 100**
Course Code: BSC-ITE-123 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVE:

1. To understand the importance of applications of Applied Physics in daily life
2. To provide the students with a basic understanding of Physics that may be required by engineers in the course of their careers
3. To acquaint students with the fundamentals of vibrations, acoustics and ultrasonic and how they help in mankind by using engineering skills.
4. To enhance knowledge related to principle working of Lasers and its different components to make it suitable for various purposes
5. To introduce the learners to the basics of Quantum Mechanics.

UNIT-I

WAVES, OSCILLATIONS AND INTRODUCTION TO ACOUSTICS: Wave motion, its types, Equations of wave motion, Energy and Intensity of a progressive wave, Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves, their detections and applications. A brief introduction to the acoustics of a hall, factors affecting the acoustics of the buildings, Reverberation Period, Sabine's Formula for calculating Reverberation Time.

UNIT-II

ELECTROSTATICS IN A LINEAR DIELECTRIC MEDIUM & MAGNETOSTATICS: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics – Point charge at the centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. Magnetostatics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

UNIT-III

QUANTUM MECHANICS FOR ENGINEERS: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wavefunction, Born interpretation, probability current, Expectation values, Free-particle wavefunction and wave-packets.

UNIT-IV

APPLYING THE SCHRODINGER EQUATION: Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator.

UNIT-V

OPTICS: Interference: Introduction, Interference due to division of wave front: Fresnel's

Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra. Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

COURSE OUTCOMES:

After completing of the course, the students will:

1. Understand the importance of Applied Physics in describing the technology we are using today in different engineering fields
2. Acquired knowledge of Waves, Vibration and acoustics, helps the students to develop the acoustically good hall.
3. Knowledge of basic Quantum Mechanics can help the students for further research applications as they can be applied to any quantum, mechanical situation to find energy, momentum etc.
4. Acquired knowledge of Optics help the students to
   a) Know more about propagation of light and wave optics.
   b) Describe the requirements for a system to act as a laser.
   c) Differentiate the various types of lasers and their means of excitation.
   d) Able to explain, which laser would best meet the need for a industrial or research task.
   e) Demonstrate an awareness of the safety responsibilities involved in working with lasers.

TEXTBOOKS/REFERENCE BOOKS:

1. **Pathania K. S. & Khera S. K.,** Waves and Vibration,
2. **Beiser**, **Arthur**, Concepts of Modern physics, TMH.
3. **Rangwala** and **Mahajan**, "Electricity and Magnetism", Tata McGraw Hill, 1998
4. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves,
5. **David J. & Cheek**, Fundamentals and application of ultrasonic waves,
6. **Avadhanulu M. N. & Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
7. **Vijaya K. K., Chandralingam S.,** Modern Physics, S. Chand & Co. Ltd, New Delhi
8. **Mani and Mehta**, G.K. "Modern Physics", Affiliated East-West Press Pvt. Ltd., 1998.
9. **Arora C.L**, Refresher Course in Physics, S. Chand & Company Ltd.
10. **Grifiths David J.,** Introduction to Quantum Mechanics, 2nd Edition 2016, Cambridge University Press
11. **Sharma K. K.**, Optics: Principles and Applications 2017, Elsevier
12. **Shankar R.**, Principles of Quantum Mechanics 2011, Springer
13. **Jenkins & White H E**, Fundamentals of Optics 4 edition 2017, McGraw Hill Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions willbe set from each unit. The student must attempt five questions at least one from each unit.

Semester-I

Course Title: Basic Electrical Engineering **Max Marks: 100**
Course Code: ESC-ITE-121 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVE: The course has been designed to provide basic knowledge to the students about the principles of electric circuit analysis, electromagnetism and transformers.

UNIT-I

REVIEW OF ELECTRIC CIRCUITS: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance. Capacitance), ohm's law, Kirchoff's current law (KCL), Kirchoff's voltage law (KVL), series and parallel combinations of resistance, inductance& capacitance. Ideal and practical voltage & current sources and their transformations, dependent voltage and current sources.

UNIT-II

D.C CIRCUIT ANALYSIS: Power & energy relations, analysis of series parallel DC circuits, StarDelta transformations (ΔY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Superposition Theorems (D.D Analysis only).

UNIT-III

A.C. CIRCUIT ANALYSIS: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

UNIT-IV

ELECTROMAGNETISM: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

UNIT-V

BASIC ELECTRICAL INSTALLATIONS: Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability

1. To understand the concepts and applications of different laws used in the circuits and network.
2. To study and analyze the D.C. Circuits with different theorem.
3. To study and analyze the A.C. Circuits with different theorem.
4. To study the concepts related to Electromagnetism.

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5. To study and understand the working of transformers incorporating with different types of Basic Electrical Installations.

TEXT/ REFERENCES BOOKS:

2. **V. D. Toro**, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
3. **L. S. Bobrow**, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. **E. Hughes**, "Electrical and Electronics Technology", Pearson, 2010.
5. **D. P. Kothari and I. J. Nagrath**, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
6. **D. C. Kulshreshtha**, "Basic Electrical Engineering", McGraw Hill, 2009.

Note For Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

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Semester-I

Course Title: Computer Fundamentals | **Max Marks: 100**
Course Code: ESC-ITE-122 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: This course is provided aiming to achieve a basic knowledge of computer and its programming among engineering students.

UNIT-I

Introduction: History and Generations of Computers, Classification and Applications of Computers. Computer Hardware: Components of a computer system, Input and Output devices, Memory Hierarchy, Primary and Secondary memory. Computer Software, System and Application Software, Utility Programs

UNIT-II

Operating System: Functions and types of O/S, DOS commands, BIOS, POST, Booting Process, Computer Virus, Types of Viruses, Use of Antivirus software.

Computer Languages (Machine, Assembly and High-level languages), Translators (Assembler, Compiler and Interpreter). Introduction to algorithm and Flow chart:

UNIT-III

Data Representation: Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

UNIT-IV

Networking: Introduction to networking, Applications, types of computer networks, Network Topology, LAN, MAN, WAN. Networking devices: Hub, switch, router, repeater, and gateway. History of Internet, Internet, extranet and intranet, WWW, E-mail, ISPs, surfing, phishing.

UNIT-V

Introduction to HTML: Introduction to HTML. Working of HTML, Creating and loading HTML page, tags, Structure of on HTML, Document, Stand Alone Tags, formatting text, Adding Images, creating hyper Links, Tables, Sending E-mails through Web Page, Sample web pages.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability

1. to converse in basic computer terminology and possess the knowledge of basic hardware peripherals.
2. to understand the basics of computer languages, Softwares, Operating systems etc.

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3. to understand and use different number systems and their representations
4. to understand computer networks, devices used for networking, and services provided by the internet.
5. to understand html and to develop webpages

TEXT/ REFERENCES BOOKS:

1. to converse in basic computer terminology and possess the knowledge of basic hardware peripherals.
2. to understand the basics of computer languages, Software's, Operating systems etc.
3. to understand and use different number systems and their representations
4. to understand computer networks, devices used for networking, and services provided by the internet.
5. to understand html and to develop webpages

Note For Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

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Semester-I

Course Title: Environmental Science | **Max Marks: 100**
Course Code: MC-ITE-121 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: This course is designed to make the engineering students to understand the significance of environment and ecology in human survival and growth. It also aims to connect the budding engineers to nature.

UNIT-I

ELEMENTS OF ECOLOGY: Definition, Scope and basic principles of ecology and environment. Biological levels of organization, population, community, ecosystem and biosphere. Climatic factors - Solar radiations, temperature, water and precipitation.

UNIT-II

ENVIRONMENTAL POLLUTION: Types of pollution, Air pollution, Noise pollution, Water pollution, Soil pollution, Thermal pollution, Radiation pollution

UNIT-III

BIOGEOCHEMICAL CYCLES: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Global Oxygen Cycles. Hydrological cycles.

UNIT-IV

SUCCESSION: Concepts of succession, Types of Succession, Trends in succession, Climax and stability, Co-evolution and group selection.

UNIT-V

MAJOR BIOMES OF THE WORLD: Characteristics of terrestrial fresh water and marine ecosystems; Forests, grasslands, lake, river and marine ecosystems of India.

COURSE OUTCOMES: Upon the completion of the course, students will able to:

1. Learn about the environment and ecology.
2. Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
3. Understand biogeochemical cycles and human contribution in it.
4. Learn succession and various types of succession.
5. Demonstrate the ability to understand the biomes of world and its importance in human survival.

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Books Suggested:

1. **J.S.Singh, S.P. Singh and S.R. Gupta**. 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).
2. **S.C. Santra.** 2011. Environmental Science. New Central Book Agency.
3. **M.H. Rao and H.V.H. Rao.** 1998. Air Pollution. Tata McGraw Hill Publication.
4. **V.P. Kudesia**. 1997. Air Pollution. Pragati Prakashan.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester-I

Course Title: Engineering Chemistry lab **Max Marks: 50**
Course Code: BSC-ITE-131 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

LIST OF EXPERIMENTS:

1. Acid Base Titrations.
2. Viscosity of Solutions, Determination of composition of sugar solutions from Viscosity.
3. Synthesis of Aspirin.
4. Determination of Functional Groups in Organic Compounds.
5. Synthesis pf p-Nitro Aniline from Acetanilide.
6. Conductometric Titrations.
7. Determination of Proteins in given sample of Food.
8. Determination of Flash and Fire Point of a Lubricant.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Laboratory Outcome:
At the end of practical course, the students will be familiarized about
CO1. Titrations,
CO2. Synthesis of organic compounds,
CO3. protein determination and viscosity of solutions and
CO4. temperature dependent properties of lubricant.

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Semester-I

Course Title: Engineering. Physics Lab | **Max Marks: 50**
Course Code: BSC-ITE-132 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

COURSE OBJECTIVE: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with experimental apparatus, the scientific method and method of data analysis.

List of Experiments: (Perform any 08)

1. Measurement of Resistance.
2. Measurement of e/m by Helical method/Thomson's method.
3. Determination of Resistivity of a given wire.
4. Determination of Band Gap of a semiconductor.
5. To determine the refractive index of the prism material using spectrometer.
6. To determine Young's modulus of a bar.
7. To determine the wavelength using Fresnel's bi-prism/diffraction grating.
8. To Determine Plank's Constant.
9. Verify the Stefan's law by incandescent lamp
10. To determine the susceptibility of a ferromagnetic material
11. Study of nano TiO2 solar cell
12. Ultrasound measurement a given liquid
13. Joule's constant experiment
14. Determination of unknown capacitance of a capacitor by de-Sauty bridge method.
15. Refractive index of a glass slab/ water by travelling microscope
16. To determine the frequency of an ac supply by using electrical vibrator
17. To find the inner and outer diameter of a hollow cylinder by using Vernier caliper.
18. To determine the diameter of a thin wire by using screw gauge and its area of cross section.
19. Measurement of 'g' and Time period by using compound pendulum.
20. To find the viscosity of a liquid using stoke's method.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Basic Electrical Lab | **Max Marks: 50**
Course Code: ESC-ITE-131 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

List of experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin's Theorem & Norton's Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Course Outcomes:

1. To study and analyze different circuit elements.
2. To study and implements different laws and theorems of electrical circuits.
3. To make the students aware about the principles and applications of basic electrical laws.
4. To measure the power using two wattmeter method.
5. To study and analyze the phenomenon of Resonance in Series and Parallel circuits.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Semester-I

Course Title: Engineering. Graphics
Course Code: ESC-ITE-132
Duration of Exam: 3 hours

Max Marks: 100
University Examination: 60
Internal Assessment: 40

COURSE OBJECTIVE: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

UNIT-I

INTRODUCTION TO ENGINEERING GRAPHICS: Engineering drawing as language of Engineers. Drawing instruments and their uses. Projections: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

UNIT-II

PROJECTION OF STRAIGHT LINE AND THEIR TRACES: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

UNIT-III

SECTION OF SOLIDS & DEVELOPMENT OF SURFACES: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes.sectional orthographic views of geometrical solids, Purpose of development, , Development of prism, cylinder, cone and pyramid surface

UNIT-IV

ORTHOGRAPHIC PROJECTIONS: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

UNIT-V

ISOMETRIC PROJECTION: Classification of pictorial views, Basic Principle of Isometric projection, Isometric Views of lines, Planes, Simple and compound Solids;, Difference between isometric projection and Isometric view, Isometric projection of solids such as cube, prism, pyramid and cylinder. Introduction to computer aided drafting (CAD)

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Laboratory Outcome:

On completion of course students must be able

CO1. To read Engineering Drawing and execute the construction work with the help of available drawing

CO2. To represent three dimensional objects by two dimensional views.

CO3. Students must be in a position to show hidden details of objects or underground constructions work by drawing sectional views.

CO4. Exposure to creating working drawings

CO5. Exposure to the visual aspects of engineering design.

TEXT BOOKS:

1. **Bhat, N. D. & Panchal, V. M**, *Engineering Drawing*, Charotar Publishers, Anand.
2. **Narayana, K. L. & Kannaiah P**, *Engineering Graphics*, Tata McGraw Hill, New Delhi.
3. **Shah, M.B. & Rana B.C.** (2008), Engineering Drawing and Computer Graphics, Pearson Education
4. **Agrawal B. & Agrawal C. M**. (2012), Engineering Graphics, TMH Publication.

REFERENCE BOOKS:

1. **Gill P. S**., *Engineering Graphics and Drafting*, Katria and Sons, Delhi.
2. **Luzzadde Warren J**., *Fundamentals of Engineering Drawing*, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Semester-I

Course Title: Computer Fundamentals Lab | **Max Marks: 50**
Course Code: ESC-ITE-133 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

List of experiments:

1. Experiments on dismantling of PC.
   - Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components.
2. Perform these DOS commands
   - Internal commands.
     - DIR, TYPE, DEL, ERASE, MD, CD, COPY, RMDIR, VER, DATE, TIME, PATH, CLS, RMDIR, VER, DATE, TIME, PATH, CLS, BREAK, SET, EXIT.
   - External commands.
     - APPEND, CHKDISK, ATTRIB, SYS, EDIT.
3. Experiments on system utilities
   - Explore and describe some system utility like regedit, memory partioning, control panel, window tools.
4. MS-Word: Introduction, Starting MS-Word, MS-Word Screen and its Components, Elementary Working with MS-Word.
5. MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
6. Create a spreadsheet of students, which contains marks obtained by students of a class in different subjects and then calculate maximum, minimum, average and sum of marks in each subject. Also calculate % of each student using functions and formulas in MS-Excel also draw pie chart and bar graph also.
7. MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.
8. Make a simple presentation on your college, use 3D effects, animation on network topologies.
9. Create HTML pages for your business website.
10. Create HTML pages showing timetable of trains departing from Jammu-Tawi railway station.
11. Create web pages for your college.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Semester-I

Course Title: Induction Program
Course Code: MC-ITE-111
Duration of Exam: - hours

Max Marks: -
University Examination: -
Internal Assessment: -

INDUCTION PROGRAM

Induction program for students to be offered right at the start of the first year. It should include but not limited to following Activities

1. Physical activity
2. Creative Arts
3. Universal Human Values
4. Literary
5. Proficiency Modules
6. Lectures by Eminent People
7. Visits to local Areas
8. Familiarization to Dept./Branch & Innovations

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SEMESTER-II

Course Title: MATHEMATICS-II **Max Marks: 100**
Course Code: BSC-ITE-221 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is designed to impart advanced knowledge of multivariable integration, theory of differential equations and complex variable to engineering students that will serve them to solve real life engineering problems.

Unit- I

Multivariable Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, spheres and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes' (without proofs).

Unit- II

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Second order linear differential equations with variable coefficients, method of variation of parameters.

Unit- III

Partial Differential Equations: Partial differential equations and its formation, Linearand non-linear partial differential equations of first order and their solutions, Charpit's method, Lagrange's method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions, Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables.

Unit- IV

Complex Variable – Differentiation:

Differentiation, Cauchy-Riemann equations, analytic functions, elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit- V

Complex Variable – Integration:

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem (without proof) and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Course Outcomes: Upon the completion of this course, the students will be able to:

1. Compute double and triple integrals over rectangular and spherical domains and memorize important theorems: Green, Gauss divergence and Stokes with their applications in various engineering problems.
2. Distinguish between linear and non-linear equations. Recognize and solve equations of Bernoulli, Euler and Clairaut.
3. Solve partial differential equations of various kinds and apply the same to solve problems of real world.
4. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.
5. Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.

Text Books

1. **Erwin Kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics**,** Jones & Bartlett.
3. **N. Piskunov,** Differential& Integral calculus, Vol-I & II
4. **Jain & Iyengar**, Advanced Engineering Mathematics, Narosa Publishers

Reference Books

1. **G.B. Thomas and R.L. Finney**, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. **S. L. Ross**, Differential Equations, 3rd Ed., Wiley India, 1984.
3. **E. A. Coddington**, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
4. **E. L. Ince**, Ordinary Differential Equations, Dover Publications, 1958.
5. **J. W. Brown and R. V. Churchill**, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

SEMESTER-II

Course Title: Basic Electronics | **Max Marks: 100**
Course Code: ESC-ITE-221 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semiconductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semiconductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, use of transistor as a switch.

Unit-IV

Biasing Techniques and biasing stability (BJT):- Need for biasing, operating point, load line analysis, bias stability. fixed bias configuration, emitter bias configuration, voltage divide bias configuration, analysis of these biasing techniques.

Unit-V

Field Effect Transistors: Operation and characteristics of JFET and MOSFET, types of MOSFET, Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Colpitts and Phase Shift oscillators (transistor version only and no derivation).

Course outcomes:
At the end of the course, the student will be able to:

- **CO1.** Describe the energy bands and the scientific principles behind conductivity in semiconductors.
- **CO2.** Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
- **CO3.** Analyze the working of various traditional transistors such as BJT and FET along with the recently used MOSFET based transistors as well as the concept of biasing in these transistors.
- **CO4.** Understand various feedback systems and oscillators.
- **CO5.** Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH

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2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Sedra & Smith,** Microelectronic Circuits, Oxford Printing Press.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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SEMESTER-II

Course Title: Engineering Mechanics | **Max Marks: 100**
Course Code: ESC-ITE-222 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: This course has been designed to make the students acquainted about forces and its effects, kinematics and statics.

UNIT-I

TWO-DIMENSIONAL FORCE SYSTEM: Basic Concepts, principal of transmissibility, resultant of a force System, Free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, Varrigon theorem, friction, law of friction, equilibrium of body lying on horizontal and inclined plane, Static and Dynamic Friction, wedge friction, Ladder friction applications.

UNIT-II

CENTROID AND CENTRE OF GRAVITY: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration composite ideas. Mass moment inertia of circular plate, Cylinder, Sphere.

UNIT-III

MEMBER FORCES IN TRUSSES: Planer truss structure, trust joint identification, strategy for planer truss analysis, Statistical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of sections).

UNIT-IV

KINEMATICS OF PARTICLES: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies rotation, absolute motion, relative motion. Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-V

VIRTUAL WORK AND ENERGY METHOD: Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic

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and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

COURSE OUTCOME:

Upon successful completion of the course, student should be able to:

1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures
2. Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts);
3. Understand basic dynamics concepts – force, momentum, work and energy;
4. Understand and be able to apply Newton's laws of motion;
5. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy;

TEXT BOOKS:

1. **Bansal R.K. (2010),** A Text Book of Engineering Mechanics, Laxmi Publications
2. **Khurmi R.S. (2010),** Engineering Mechanics, S. Chand & Co.

REFERENCE BOOKS:

1. **Irving H. Shames (2006),** Engineering Mechanics, 4th Edition, Prentice Hall
2. **F. P. Beer and E. R. Johnston (2011),** Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill
3. **R. C. Hibbler (2006),** Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
4. **Andy Ruina and Rudra Pratap (2011),** Introduction to Statics and Dynamics, Oxford University Press
5. **Shanes and Rao (2006),** Engineering Mechanics, Pearson Education,
6. **Hibler and Gupta (2010),** Engineering Mechanics (Statics, Dynamics) by Pearson Education
7. **Reddy Vijay kumar K. and K. Suresh Kumar (2010),** Singer's Engineering Mechanics

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

SEMESTER-II

Course Title: C- Programming | **Max Marks: 100**
Course Code: ESC-ITE-223 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: This course is provided aiming to enhance the logical skills of engineering students with the basic programming concepts and implementation in C Programming.

UNIT I

Introduction to C Programming: Overview of programming languages, algorithms and flowcharts, History of C, Structure of a C Program, Compiling & Executing a C program. Constants, Variables and Data Types, Storage classes, Operators and Expressions, Data Input and Output.

UNIT II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Looping: while statement, do-while statement, for statement.

UNIT III

Introduction to arrays: One dimensional array, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, strings, basic string operations**.**

User defined data types: Structure, Defining structures, Array of Structures, Introduction to Union and enumerated data types.

UNIT IV

Functions: Introduction to Function, Types of functions, function declaration, calling a function, passing arguments to functions, passing arrays to functions, Recursion.

UNIT V

Introduction to Pointers & Files: Operations on pointer, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Introduction to File, Operations on files: open, close, read and write.

COURSE OUTCOMES:

The student will be able:

1. To translate the algorithms and flowcharts to programs (in C language) for execution.
2. To make the usage of various control statements for developing an efficient program to solve the problems.
3. To decompose a complex problem into functions for solving it efficiently.
4. To use the arrays and user defined data types for synthesizing a complete program.
5. To use pointers, files and dynamic memory allocations to perform several operations in programs.

Text Books

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1. **Yashavant P. Kanetkar ,** Let Us C, BPB Publication, 15th Edition.
2. **Gottfried**, Programming with C, TMH.

Reference Books

1. **E. Balaguruswamy**, Programming in ANSI C, Tata McGraw-Hill.
2. **Venugopal**, C Programming, TMH.
3. **Yashwant Kanitkar**, Pointers in C, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one.

SEMESTER-II

Course Title: Communication Skills | **Max Marks: 100**
Course Code: HSMC-ITE-221 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: This subject is designed to attain the general proficiency in English language for the engineering students.

UNIT-I

Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives., Synonyms, antonyms, and standard abbreviations.

UNIT-II

Basic Writing Skills: Use of phrases and clauses in sentences, Importance of proper punctuation,Memos,Enquiry letter,Job Application letter,Adjustments and Sales letters, Techniques for writing precisely.

UNIT-III

Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Articles, Prepositions, Redundancies and Clichés.

UNIT-IV

Speaking skills- Interviews-Meaning,types of Interview,notices,Agenda, Minutes of meeting, writing introduction and conclusion.

UNIT-V

Writing Practices: Comprehension, Précis Writing, Essay Writing.

COURSE OUTCOMES: Upon the completion of the course, the students will be able:

1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. To make the students authoritative in self-expression in their day-to-day life in this fast-changing world.
3. To identify the common errors involved in writing.
4. To understand the nature and style of sensible writing.
5. To write effective and coherent paragraphs.

TEXT BOOKS

1. Practical English Usage. **Michael Swan**. OUP. 1995.
2. Remedial English Grammar**. F.T. Wood**. Macmillan.2007
3. Study Writing. **Liz Hamp-Lyons and Ben Heasly**. Cambridge University Press. 2006.
4. Communication Skills. **Sanjay Kumar and Pushp Lata**. Oxford University Press. 2011.
5. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one.

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SEMESTER-II

Course Title: Indian Constitution
Course Code: MC-ITE-221
Duration of Exam: 3 hours

Max Marks: 100
University Examination: 60
Internal Assessment: 40

COURSE OBJECTIVE: The basic purpose of this subject is to make a general awareness about our constitution.

UNIT I

CONSTITUTIONAL FRAMEWORK: Historical Background, Making of the constitution, Salient features of the Indian Constitution, Preamble to the Constitution, Union and its territory, Citizenship, Fundamental rights, Directive principles of state policy, Fundamental duties, Amendment of the constitution, Basic structure of the constitution.

UNIT II

SYSTEM OF GOVERNMENT: Parliamentary system, Federal System, Centre-state relations, Inter-state relations, Emergency provisions

UNIT III

CENTRAL GOVERNMENT: President, Vice-President, Prime Minister, Central Council of Ministers, Cabinet committees, Parliament, Parliamentary committees, Parliamentary forums, Supreme Court

State Government: Governor, Chief Minister, State Council of Ministers, State legislature, High court, Subordinate Courts, Special status of Jammu and Kashmir, Special provision for some states

Local Government: Panchayati raj, Municipalities

UNIT IV

CONSTITUTIONAL BODIES: Election commission, Union Public service commission, State Public Service Commission, Finance Commission, National Commission for SC's, National Commission for ST's, Special officer for Linguistic minorities, Comptroller and auditor general of India, Attorney General of India, Advocate General of India.

UNIT V

NON-CONSTITUTIONAL BODIES: Planning Commission, National Development Council, National Human Rights Commission, State Human Rights Commission, Central Information Commission, State Information Commission, Central vigilance Commission, Central Bureau of Investigation, Lokpal and Lokayuktas

Other Constitutional Dimensions: Co-operative societies, Official Language, Public services, Tribunals, Rights and Liabilities of the Government, Authoritative text of the Constitution in Hindi Language, Special Provision relating to certain classes.

COURSE OUTCOME: Upon the completion of this, the students will able to know:

1. About the constitutional framework.
2. About the government system
3. Various type of government
4. About Constitutional bodies: Election commission, UPSC, SPSC, Commission for ST/SC and many others.
5. Non-constitutional bodies: Planning Commission, NDC, NHRC, SHRC, CBI, Vigilance Commission and other dimensions of constitution.

BOOKS RECOMMENDED:

1. **M.P. Jain**, Indian Constitutional Law, 7th Edition.
2. **B. K. Sharma**, Introduction to the Constitution of India,PHI.

SEMESTER-II

Course Title: Communication Skills Lab
Course Code: HSMC-ITE-231
Duration of Exam: 2 hours

Max Marks: 50
University Examination: 25
Internal Assessment: 25

Lab Objective: The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Course Outcome:
Upon the completion of the lab, the students will be able to:

CO1. Developing intellectual, personal and professional abilities.
CO2. On completion of the course, the students will be accurate in communication.
CO3. The students will be able to communicate effectively on complex engineering activities with the engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give andreceive clear instructions

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SEMESTER-II

Course Title: Basic Electronics Lab | **Max Marks: 50**
Course Code: ESC-ITE-231 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

List of Experiments:

1. To plot the Resonance curve for a series & parallel resonance.
2. To determine and plot operating characteristics of a PN junction diode
3. To study the input / output waveforms of Half wave and bridge wave rectifiers
4. To suppress the ripple in rectifiers using RC filters.
5. To study the clipper and clamper circuits.
6. To study the Zener characteristics and its application as voltage regulator
7. To plot characteristics of transistor in CE/CB configuration
8. To plot characteristics of a BJT.
9. To plot MOSFET characteristics.
10. To study frequency response of RC Coupled Oscillators.

Course Outcome:
Upon the completion of course, the students will be able to:
CO1. Determine the characteristics of PN Junction and Zener diode.
CO2. Design various rectifiers configuration and evaluate its various performance parameters.
CO3. Design and analyze various wave shaping circuits.
CO4. Determine the characteristics of a BJT and MOSFET
CO5. Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change someexperiments relevant to the course contents.

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Course Title: Engineering Mechanics Lab **Max Marks: 50**
Course Code: ESC-ITE-232 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

SEMESTER-II

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwellhardness testing machine.
5. To very Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Course Outcome:
After the completion of lab course students will be-

CO1. Able to understand different engineering mechanics apparatus.

CO2. Able to understand the mechanical properties of materials.

CO3. Able to understand the moment of inertia of various shapes.

CO4. Get the practical idea of frictional forces.

CO5. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER-II

Course Title: C-Programming Lab | **Max Marks: 50**
Course Code: ESC-ITE-233 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

Lab. Objectives: The course is designed to provide practical foundation for computer programming and to familiarize students with error handlings in programming.

List of Experiments:

1. Familiarization with programming environment.
2. Basic programs in Sequential Statement in C
3. Simple computational problems using arithmetic expressions.
4. Problems involving if-then-else structures.
5. Iterative/looping problems e.g., sum of series.
6. Performing operations on 1D Array.
7. Performing operations on 2D Array.
8. Performing operations on String.
9. Programs on Function declaration, definition and calling.
10. Implementation of Mathematical function
11. Programming for solving Numerical methods problems.
12. Programs on Recursive functions.
13. Programs on Pointers and structures.
14. Programs on File operations.

Course Outcomes:

1. To be able to correct syntax and logical errors as reported by the compilers and run time for basic programs.
2. To be able to write iterative as well as recursive programs using functions as well
3. To be able to represent data in arrays, strings and structures and manipulate through a program
4. To be able to declare pointers of different types and use them in defining self-referential structures.
5. To be able to create, read and write to and from simple text files.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER-II

Course Title: Work Shop Practice **Max Marks: 50**
Course Code: ESC-ITE-234 **University Examination:**
Duration of Exam: 2 hours **Internal Assessment: 50**

Detailed contents

Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods

1. Fitting operations & power tools.
2. Electrical & Electronics
3. Carpentry
4. Plastic moulding, glass cutting.
5. Metal casting.
6. Welding (arc welding & gas welding), brazing**.**

COURSE OUTCOMES: Upon completion of this course, the students will:

1. Gain knowledge of the different manufacturing processes which are commonly employed in the industry,
2. Be able to fabricate components using different materials.

TEXT BOOKS:

1. **Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K.,** ―Elements of Workshop Technology‖, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. **Kalpakjian S. And Steven S. Schmid**, ―Manufacturing Engineering and Technology, 4th edition, Pearson Education India Edition, 2002.
3. **Gowri P. Hariharan and A. Suresh Babu,** Manufacturing Technology – I‖Pearson Education, 2008.
4. **Roy A. Lindberg**, Processes and Materials of Manufacture‖, 4th edition, Prentice Hall India, 1998.
5. **Rao P.N**., Manufacturing Technology, Vol. I and Vol. II, Tata McGrawHill House,

Workshop Practice

1. Machine shop **(10 hours)**
2. Fitting shop **(8 hours)**
3. Carpentry **(6 hours)**
4. Welding shop **(8 hours (Arc welding 4 hrs + gas welding 4 hrs)**
5. Smithy **(6 hours)**

Laboratory Outcomes: Upon completion of this laboratory course, the students will be able to:

1. Fabricate components with their own hands.

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Get practical knowledge of the dimensional accuracies and dimensional tolerancespossible with different manufacturing processes.

2. Assemble different components and produce small devices of their interest.

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

SEMESTER-III

Course Title: Mathematics-III | **Max Marks: 100**
Course Code: BSC-ITE-321 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVES:
Collect, organize, represent, analyze, interpret data and make conclusions and predictions from its results. Apply mathematical knowledge and skills to familiar and unfamiliar situations, appreciate the role, value and use of Mathematics in society.

UNIT-I

INTEGRAL TRANSFORM-I: Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integral differential equations.

UNIT-II

INTEGRAL TRANSFORM-II: Fourier integral, Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

UNIT-III

Z-T RANSFORM: Introduction and definition of z-transform, Some standard forms, Linearity property, Damping rule Some standard results, shifting un to the right and to the left, Multiplication by n. Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

UNIT-IV

BASIC PROBABILITY: Probability spaces, conditional probability, independence; discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequence of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables.

UNIT-V

BASIC STATISTICS: Measures of Central tendency: Moments, skewness and Kurtosis -

Probability distributions: Binomial, Poisson and Normal-evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas.

COURSE OUTCOME:

1. Understand special functions and series solutions
2. Applications of Laplace transform in solving differential and integro-differential equations.
3. Understand and apply Applications of F-transform and its applications.
4. Understand and apply Measurement of central tendency for problem solving.
5. Understand and apply laws of probability and various data distributions and its applications.

TEXT BOOKS:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **Ross, A**: First Course in Probability, 6th Ed., Pearson Education India, 2002.
3.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Use of calculator is allowed in the examination.

SEMESTER-III

Course Title: Digital Logic Design | **Max Marks: 100**
Course Code: PCC-ITE-321 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVES:

The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

UNIT I

Introduction, Binary numbers, Base-conversions, Octal and hexadecimal numbers, Binary codes, Concept of fixed and floating point numbers, Complement Number Representation, Addition, Subtraction, Multiplication, and Division. Review of Boolean algebra, DeMorgan's Theorems, Boolean functions and representation in canonical and standard forms, SOP and POS forms.

UNIT II

Digital Logic Gates, IC Digital Logic Families, Karnaugh Map Method: 3 variable , 4 variable, 5 variable Map, limitations of K-maps for larger variables, POS-simplification, NAND/NOR implementation, other 2-level implementations, Don't-care conditions, Tabular method.

UNIT-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, ParityCheckers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

UNIT-IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

UNIT V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor

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Memories, Random-Access Memories (ROM),Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. Ability to identify basic requirements for a design application and propose a cost effective solution.
4. The ability to identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build and trouble digital circuits.

TEXT BOOKS:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.

REFERENCE BOOKS:

1. **Thomas L. F.,** Digital Fundamentals, Prentice Hall, Inc, 4thEdition 1997
2. **Tocci R. J. &Widner**, Digital Systems: Principles and Applications, PHI.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Use of calculator is allowed in the examination.

SEMESTER-III

Course Title: Operating System | **Max Marks: 100**
Course Code: PCC-ITE-322 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVES:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

UNIT-1

Introduction: Introduction to Operating System, History of Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods. Operating System Structure: System Components, System Structure.

Unit-II

Process Management: Process concept, Process states, Principle of Concurrency, Semaphores and its types. Process Scheduling, Process Synchronization, Classical problems in Concurrency, Producer Consumer, Critical Section and readers writers problem, Producer Consumer Problem, Inter Process Communication, Process Generation, Resident Monitors.

Unit-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithms, Multiprocessor Scheduling.
Deadlock: System Model, Shared resource, Resource allocation and Scheduling, Resource allocation graph, Deadlock Characterization, Prevention, Detection and Recovery.

Unit-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Unit-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISKI/O, Disk Scheduling algorithms and Operating System Design Issues.
File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing. Unix and Linux Operating System as case studies, Time OS and Mobile OS.

COURSE OUTCOMES: At the end of this course, the students will be able to do the following:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.

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3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement a file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

TEXT BOOKS:

1. Milenekovic, Operating System Concepts, McGraw Hill
2. Silverschwatz, Operating System Concepts, Willey & Willey.

REFERENCE BOOKS:

1. Dietel, An introduction to operating system, Addision Wesley.
2. Tannenbaum A. S., Operating system design and implementation, PHI

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-III

Course Title: Data structure using C++ **Max Marks: 100**
Course Code: PCC-ITE-323 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures.

UNIT-I

Overview of C++: Overview of C++ – Structures – Class Scope and Accessing Class Members – Reference Variables – Constructors – Destructors – Member Functions and Classes – Friend Function – Dynamic Memory Allocation – Static Class Members – Overloading: Function overloading and Operator Overloading. Prepare a student record using class and object. Find the complex operations of a number using constructor.

UNIT-II

REVIEW OF DATA TYPES AND CONCEPTS: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.
SEARCHING AND SORTING: Searching: Sequential search, Binary search, Hashing, General Idea, Hash Function, Separate Chaining, Open Addressing, Linear Probing. Sorting**:** Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

UNIT-III

EXPRESSION AND LINEAR DATA STRUCTURE: Definition of a Data structure, ADT, Linear Data structures. Stack: Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix. Queue: Types, Operations, Applications, implementation using linked list as well as arrays. Linked List: Types, Operations, Applications, Implementation.

UNIT-IV

TREES: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees: Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

UNIT-V

GRAPHS: Definitions, Graphs, Representation of Graphs: Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms: Dijkstra's Algorithm and Warshall's Algorithm, Minimum Spanning Tree, Kruskal's Algorithm and Prim's Algorithm.

COURSE OUTCOMES:

1. Write simple programs using C++.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyse the same to determine the computational complexity.
4. Student will able to write an algorithm based on Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the computational complexity

TEXT BOOKS:

1. **Tanenbaum A. S**., Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.

REFERENCE BOOKS:

1. **E. Horowitz and S. Shani,** Fundamentals of Data Structures in C, Galgotia Pub. 1999.
2. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-III

Course Title: Object Oriented Programming using Java **Max Marks: 100**
Course Code: PCC-ITE-324 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES: To provide a good understanding of Object Oriented Programming Language and its implementation using Java.

UNIT-I
Introduction to Java: Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

UNIT-II
Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

UNIT-III

Inheritance and Polymorphism: Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

UNIT-IV

Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing. Generic programming with templates: Class templates, Function Templates.

UNIT-V
I/O programming & Multithreading: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

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COURSE OUTCOMES: After taking the course, students will be able to:

1. Understand the basics of java programming.
2. Understand the basic principles of the object-oriented programming.
3. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
4. Design applications with an event-driven graphical user interface.
5. Implement I/O and multithreading in Java

TEXT BOOKS:

1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press
3. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.

REFERENCE BOOKS:

1. Core Java Volume-I Fundamentals., Eight Edition, Horstmann & Cornell, Pearson Education
2. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH
3. Java Programming, D. S. Malik, Cengage Learning

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER-III

Course Title: Human Values and Professional Ethics	**Max Marks: 100**
Course Code: HSMC-ITE-321	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

OBJECTIVES: To enable the students to create awareness on Engineering Ethics and Human Values, to instil Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I

Human Values: Morals, values and Ethics, Integrity, Work ethic, Service learning, Civic virtue, Respect for others, living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Character, Spirituality, Introduction to Yoga and meditation for professional excellence and Stress management.

UNIT II

Engineering Ethics: Senses of "Engineering Ethics" Variety of moral issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Models of professional roles, Theories about right action, Self-interest, Customs and Religion, Uses of Ethical Theories

UNIT III

Engineering as Social Experimentation: Engineering as Experimentation, Engineers as responsible Experimenters, Codes of Ethics, A Balanced Outlook on Law.

UNIT IV

Safety, Responsibilities and Rights: Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and Reducing Risk, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination.

UNIT V

Global Issues: Multinational Corporations, Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors, Moral Leadership, Code of Conduct, Corporate Social Responsibility.

COURSE OUTCOMES: Upon completion of the course, the student should be able to
Recognize importance of human values

1. Harmony and ethical behavior in real life situations
2. Apply ethics in society
3. Discuss the ethical issues related to engineering
4. Realize the responsibilities
5. Rights in the society

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCE BOOKS:

1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundametals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001
5. Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity and Social Responsibility” Mc Graw Hill education, India Pvt. Ltd, New Delhi 2013.
6. World Community Service Centre, „ Value Education“, Vethathiri publications, Erode, 2011

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

SEMESTER-III

Course Title: Data Structures using C++ Lab | **Max Marks: 50**
Course Code: PCC-ITE-331 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

OBJECTIVES:

The course is designed to develop skills to design and analyze simple linear and nonlinear data structures. It strengthens the ability to the students to identify and apply the suitable data structure for the given real-world problem.

List of Experiments:

1. Program to demonstrate concept of objects, classes, inheritance and overloading in c++.
2. Program to demonstrate concept of structures.
3. Program to implement single Linked List.
4. Program to implement Doubly Linked List.
5. Program to implement Stack using Linked List.
6. Program to implement Queue using Linked List.
7. Program to implement Stack using arrays.
8. Program to implement Queue using arrays.
9. Program to Create and Copy a Tree.
10. Program to implement Tree Traversal.
11. Program to implement Insert and Delete Operation on Trees.
12. Program to implement AVLTrees.
13. Program to implement Warshal's algorithm to find path matrix.
14. Program to implement Djikstra's algorithm.
15. Program to implement Binary Search.
16. Program to implement Bubble, Selection, Insertion, Heap, Merge and Quick Sort.

COURSE OUTCOMES:

1. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
2. Understand basic data structures such as arrays, linked lists, stacks and queues. Describe the hash function and concepts of collision and its resolution methods
3. Solve problem involving graphs, trees and heaps.
4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER-III

Course Title: Object Oriented Programming using Java Lab **Max Marks: 50**
Course Code: PCC-ITE-332 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

OBJECTIVES: Understand fundamentals of programming such as variables, conditional and iterativeexecution methods.

List of Experiments:

1 Program to define a structure of a basic JAVA program
2 Program to define the data types, variable, operators, arrays and control structures.
3 Program to define class and constructors. Demonstrate constructors.
4 Program to define class, methods and objects. Demonstrate method overloading.
5 Program to define inheritance and show method overriding.
6 Program to demonstrate Packages.
7 Program to demonstrate Exception Handling.
8 Program to demonstrate Multithreading.
9 Program to demonstrate I/O operations.
10 Program to demonstrate Layout managers.

COURSE OUTCOMES: At the end of this course, the student will able to do the following:

1. Understanding and implementation of various object-oriented programming concepts like inheritance, polymorphism, object and classes etc.
2. Designing the application using the object-oriented concepts

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER-III

Course Title: Digital Logic Design Lab | **Max Marks: 50**
Course Code: ESC-ITE-331 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

OBJECTIVES:

To provide hand-on experience in designing and implementing digital/logic circuits**.** The laboratory exercises are designed to give students ability to design, build, and implement digital circuits and systems

List of experiments:

1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary
3. Design and implementation of functions, code converters.
4. Design and implementation of combinational circuits using MSI devices:
   a. 4 – bit binary adder / subtractor
   b. Parity generator / checker
   c. Magnitude Comparator
   d. Application using multiplexers
5. Design and implementation of sequential circuits:
6. Shift –registers
7. Synchronous and asynchronous counters
8. Coding combinational / sequential circuits using HDL.
9. Design and implementation of a simple digital system.

COURSE OUTCOMES: At the end of this course, the students will able to do the following:

1. Design and implementation of combinational circuits like adder, subtractor, encoder and decoder, multiplexer and De-multiplexer etc.
2. Able to simulate various circuit designs through circuit maker and electronics workbench or any other tools.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Semester III

Course Title: Capstone Project -I **Max Marks: 50**
Course Code: PROJ-ITE-331 **University Examination: 0**
Internal Assessment: 50

Course Objectives: To facilitate the students learn and apply an engineering design process in Information Technology & Engineering, including project resource management. As a part of a team, the students will make a project, that emphasizes, hands-on experience, and integrates analytical and design skills. The idea is to provide an opportunity to the students to apply what they have learned throughout the course of graduate program by undertaking a specific problem.

Course Description Capstone Project is increasingly interdisciplinary and requires students to function on multidisciplinary teams. It is the process of devising a system, component or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs." It typically includes both analysis and synthesis performed in an iterative cycle. Thus, students should experience some iterative design in the curriculum. As part of their design experience, students have an opportunity to define a problem, determine the problem scope and to list design objectives. The project must also demonstrate that students have adequate exposure to design, as defined, in engineering contexts. Engineering standards and realistic constraints are critical in engineering design. The program must clearly demonstrate where standards and constraints are taught and how they are integrated into the design component of the project. Each group will have 4-5 students. Each group should select their team leader and maintain daily diary. Each Group will work under mentorship of a faculty supervisor. Each group must meet the assigned supervisor (2hrs slot/week) till the end of the semester (record of attendance will be maintained), as per the time slot which will be provided to them by the respective supervisor. This is mandatory requirement for the fulfilment of the attendance as well as the successful completion of the project. The faculty supervisor of the project will continuously assess the progress of the works of the assigned groups.

Course outcomes (COs): After the completion of the course, the student will be able to:

1. Develop skills necessary for structuring, managing, and executing the projects.
2. Design, develop, debug, document, and deliver a project and learn to work in a team environment.
3. Develop written and oral communication skills.
4. Become proficient with software development tools and environments
5. Apply interdisciplinary knowledge to engineering design solutions, taking into account professional and ethical issues.

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SEMESTER IV

Course Title: Database Management System | **Max Marks: 100**
Course Code: PCC-ITE-421 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: The main objective of this course is to introduce the basic concepts of database, data modeling techniques using entity relationship diagram, relational algebra and calculus, basic and advanced features SQL, normalization, transaction processing, concurrency control, and recovery techniques.

UNIT-I

INTRODUCTION: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, Structure of DBMS.

Data Modelling Using Entity Relationship Model: ER Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Extended ER model concepts.

RELATIONAL MODEL: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity,

UNIT-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple Calculus - Domain calculus.

INTRODUCTION TO SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Sub queries, Aggregate and Scalar Functions, Triggers.

UNIT-III

Normalization – Functional Dependencies, Armstrong's axioms for FD's, Normal Forms: First, Second, Third Normal forms, BCNF, Properties of Decompositions, Multivalued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal form, Inclusion Dependencies.

UNIT-IV

Transaction & Concurrency Control: Transaction Concept, Transaction State, ACID properties. Schedules, Serializability, Testing of Serializability, Recoverability. Recovery from Transaction Failures, Log Based Recovery, Checkpointing, Shadow Paging.

Concurrency Control: Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

UNIT-V

Implementation Techniques- Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

COURSE OUTCOMES:

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

TEXT BOOKS:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education

REFERENCE BOOKS:

1. **J. D. Ullman** "Principles of Database and Knowledge – Base Systems", Vol 1 by, Computer Science Press.
2. **R. Elmasri and S. Navathe,** "Fundamentals of Database Systems", 5th Edition by Pearson Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

SEMESTER IV

Course Title: Computer Organization & Architecture **Max Marks: 100**
Course Code: PCC-ITE-422 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES OF THE COURSE: To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism
6. To impart the knowledge on micro programming
7. Concepts of advanced pipe-lining techniques.

UNIT-I

FUNDAMENTALS OF A COMPUTER SYSTEM: Functional Units of a Digital Computer, Hardware, Software Interface, Translation from a High Level Language to the Hardware Language, Instruction Set Architecture Styles and features RISC and CISC Architectures, Performance Metrics, Amdahl's Law, Case Studies of ISA

UNIT II

ARITHMETIC FOR COMPUTERS: Integer Addition and Subtraction, Fast Adders, Multiplication, Booths multiplication algorithm, Division, Floating Point Numbers Representation, IEEE 754 single and double precision formats, floating point arithmetic.

UNIT III

BASIC PROCESSING UNIT: Components of the Processor, Data path and Control, Execution of a Complete Instruction, Hardwired and Micro programmed Control, Instruction Level Parallelism, Basic Concepts of Pipelining, Pipelined Implementation of Data path and Control – Hazards – Structural, Data and Control Hazards –Exception handling

UNIT IV

ADVANCED CONCEPTS IN ILP AND CURRENT TRENDS: Exploitation of more ILP, Hardware and Software Approaches, Dynamic Scheduling, Speculation, Compiler Approaches, Multiple Issue Processors, ILP and Thread Level Parallelism, Current Trends, Multicore Processors

UNIT V

MEMORY AND I/O: Need for a hierarchical memory system, Types and characteristics of memories,Cache memories –Improving cache performance – Virtual memory – Memory Management techniques – Associative memories.

COURSE OUTCOMES:

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.

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2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

TEXTBOOKS:

1. **David A. Patterson and John L. Hennessy,** "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by Elsevier.
2. **Carl Hamacher** "Computer Organization and Embedded Systems", 6th Edition by McGraw Hill Higher Education.

REFERENCE BOOKS:

1. **John P. Hayes,** "Computer Architecture and Organization", 3rd Edition by WCB/McGraw-Hill
2. **William Stallings,** "Computer Organization and Architecture: Designing for Performance", 10th Edition by Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

SEMESTER IV

Course Title: Design & Analysis of Algorithms | **Max Marks: 100**
Course Code: PCC-ITE-423 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: The objective of this course is to study various paradigms and approaches used to design and analyze algorithms and to appreciate the impact of algorithm design in practice for solving the problems.

Unit-I

Introduction to Algorithm: Areas of Study of Algorithms, Algorithm Design Paradigms, Concept of Algorithmic Efficiency, Run Time Analysis of Algorithms, Asymptotic Notations (O, Ω, Θ).

Divide and Conquer: Structure of Divide and Conquer Algorithms: Examples; Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Strassen's Matrix Multiplication; Analysis of Divide and Conquer Run Time Recurrence Relations.

Un1it-II

Greedy Method: Overview of the Greedy Paradigm, Examples of Exact Optimization Solution (Minimum Cost Spanning Tree Using Prim's and Kruskal's Algorithms), Approximate Solution (Knapsack Problem), Single Source Shortest Paths.

Unit-III

Dynamic Programming: Overview, Difference between Dynamic Programming and Divide and Conquer, Applications: Shortest Path In Graph (Multistage Graph, All-Pairs Shortest **Paths, Single-Source Shortest Paths:** General Weights), Matrix Chain Multiplication, Traveling Salesman Problem, Longest Common Sub-sequence Problem.

Unit-IV

Graph Searching and Traversal: Overview, Binary Tree Traversal, Graph Traversal Methods (Depth First and Breadth First Search). **Back Tracking**: Overview, 8-Queens Problem, 0/1 Knapsack Problem.

Unit-V

Branch and Bound: LC Searching, Bounding, FIFO Branch and Bound, LC Branch and Bound Application: 0/1 Knapsack Problem, Traveling Salesman Problem. Concepts of Complexity Classes P, NP, Polynomial vs. Non-Polynomial Time Complexity, Reducibility, NP-Hard and NP-Complete Classes.

Course Outcomes: At the end of this course, the students are able to do the following:

1. Design algorithms using divide and conquer technique and also analyze them.
2. Design algorithms for different problems using greedy method.
3. Solve problems efficiently using dynamic programming techniques.
4. Design algorithms for graph traversal and search. Also application of backtracking technique to solve the problems.

5. Design algorithms for different problems using branch and bound technique. Also to categorize the problems into different classes.

Text Books:

1. Horowitz E., Sahni S., &Rajasekaran S., Fundamental of Computer Algorithms, Galgotia Publication
2. Basse Sara, Gelder A. V., Computer Algorithms, Addison Wesley.
3.

Reference Books:

1. Cormen T. H., Leiserson, Rivest and stein, Introduction of Computer algorithm, PHI.
2. Goodrich and Tamassia, Algorithm Design, Wiley student edition.
3.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER IV

Course Title: Discrete mathematics | **Max Marks: 100**
Course Code: PCC-ITE-424 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVES:

The Course is designed to impart basic knowledge of Set theory, Logic and Graph theory and their applications to engineering pupils.

UNIT-I

SET THEORY AND FUNCTIONS: Basic concepts, Venn diagram, Set Operations, principle of Inclusion and Exclusion, Relation types of relations, properties of relation, Function: definition and notation, one to one, onto, one to one and onto, composition of functions.

UNIT-II

LOGIC: Propositional Calculus-Statements and Notations, Logical operators, Connectives and Truth tables, Bi-conditional statements, Tautologies, Duality Law.

UNIT-III

GRAPHS: Definitions and examples of graphs Incidence and degree, Handshaking lemma, Isomorphism Sub-graphs, Weighted Graphs, Eulerian Graphs, Hamiltonian Graphs Walks, Paths and Circuits, Shortest Path Algorithm, Fleury's and Dijsktra's Algorithm, Chinese Postman problem.

UNIT-IV

TREES: Definition and properties of trees Pendent vertices centre of a tree Rooted and binary tree, spanning trees, minimal spanning tree, Prim's and Kruskal's Algorithms for minimal spanning tree.

UNIT-V

PLANAR GRAPHS & MATRIX REPRESENTATION OF GRAPHS: Definition of planar graph, Euler's theorem for planar graph, Kuratowski's graphs, Incidence, Adjacency Matrices and their properties.

COURSE OUTCOMES: Upon completion of this course, the students will be able to:

1. Understand basic concept of functions and relations
2. Understand and use argument, evaluation, analysis, logic and truth tables.
3. Comprehend the basic terminology and analyze applications of graph theory in modern society.

4. Learn to model problems using graphs and understand some basic algorithms to solve these real-world problems.
5. Understand relation between matrix theory and graph theory.

TEXT BOOKS:

1. **Kolman, Busby & Ross,** "Discrete Mathematical Structures". Prentice Hall 6th edition.
2. **S. Santha**, "Discrete Mathematics with Combinatorics and Graph theory". Cengage Learning.

REFERENCE BOOKS:

1. **Kenneth H Rosen**, "Discrete Mathematics and its applications with Combinatorics and Graph Theory", McGraw Hill
2. **Graham, R. M., D. E., Knuth & O. Patashnik [1989]**, Concrete Mathematics, A Foundation for Computer Sciences, Addison Wesley

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

SEMESTER IV

Course Title: Computer Networks | **Max Marks: 100**
Course Code: PCC-ITE-425 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVES:

- To provide insight about fundamental concepts and reference models (OSI and TCP/IP) and Its functionalists.
- To gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP.
- To know the implementation of various protocols

UNIT- I

Introduction: Basic communication model, Introduction to data communication, components of data communication system, data flow (simplex, half –duplex and full duplex), data transmission (parallel transmission, serial transmission), introduction to computer network, components of computer network, advantages and disadvantages of computer networks, network criteria, network topology, OSI and TCP-IP.

PHYSICAL LAYER: Functions of Physical Layer. Classification of transmission medium.

UNIT-II

Data Link Layer and Medium Access Sub Layer: Functions of Data link Layer, Error Detection and Error Correction (type of errors, Redundancy, coding) parity checking, CRC, Flow Control and Error control protocols, Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window Piggybacking, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA.

UNIT-III

Network Layer: Functions of Network Layer, Packet Switching and Datagram approach, IP addressing methods, IPV4, IPV6, transition from IPv4 to IPv6 (Dual stack and tunneling) Sub netting, Delivery (direct, indirect), Forwarding (forwarding techniques) Routing protocols (RIP, OSPF, BGP), unicast, multicast and broadcast routing Bellman ford and Dijkstra algorithm, ARP, RARP, BOOTP and DHCP.

UNIT-IV

Transport Layer: Functions of Transport Layer, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion control, Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT-V

Application Layer: Domain Name Space (DNS), TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, Bluetooth, Firewalls, Basic concepts of Cryptography.

Course outcomes:

1. Explain the functions of the different layer of the OSI Protocol.
2. Able to understand the two main functions of Data link layer i.e data link control and media access control

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3. Able to understand the delivery, forwarding and routing of packets.
4. Understand the difference between process to process, host to host and node to node communication.
5. Able to understand what services are provided by the application layer to the user.

TEXT BOOKS:

1. Behrouz A. Forouzan, Data Communication and Networking, 4th Edition, McGraw Hill.
2. William Stallings, Data and Computer Communication, 8th Edition, Pearson Prentice Hall India.

REFERENCE BOOK:

1. Andrew S. Tanenbaum, Computer Networks, 8th Edition, Pearson New International Edition.
2. Douglas Comer, Internet working with TCP/IP, Volume 1, 6th Edition Prentice Hall of India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

SEMESTER IV

Course Title: Python Programming | **Max Marks: 100**
Course Code: PCC-ITE-426 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: Python is a modern language useful for writing compact code specifically for Programming in Server-Side web Development, AI, data analytics and Game Programming. This course covers the basics and advanced python programming to harness its potential for modern computing requirements

Unit-I

Introduction to Python: Introduction to Python, History, Installation and Working, Understanding variables, basic operators, and blocks. Declaring and using Numeric and string data type, defining list and list slicing, Use of Tuple data type, Working with sequence. Flow Control: Conditional blocks using if, else and else if, loops in python For loop, while loops in python, Loop manipulation using pass, continue, break and else Programming.

Unit-II

Python Functions, Modules and Packages: Organizing python codes using functions, modules. Importing own module as well as external modules, Understanding Packages, Powerful Lamda function. Python String, List, tuple, set and Dictionary Manipulations

Unit-III

Python Object Oriented Programming –Concept of class, object and instances, Constructor, class attributes and destructors, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support. Multithreading: Understanding threads, forking threads, Synchronizing the threads, Programming using multithreading. Working with System (sys Module), Working with Operating System (os module).

Unit-IV

Python File Operation: Reading and Writing files in python, read functions and write functions, manipulating file pointer using seek, Programming using file operations. Python Regular Expression: pattern matching and searching using regex in python, Real time parsing of networking or system data using regex, Password, email, URL validation using regular expression

Unit-V

Python Exception Handling: Avoiding code break using exception handling, Handling and helping developer with error code, Built-in exception. Database Interaction**:** SQL Database connection using python, Creating and searching tables, Reading and storing config information on database, Programming using database connections

COURSE OUTCOMES: At the end of this course, the students will able to do the following:

1.To understand data and the operations that can be applied to each data type
2.To write programs that get input, perform calculations, and provide output
3.To understand the OOPs concepts with respect to fourth generation language

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4.To write well designed and well documented programs that is easily maintainable.
5.To test and debug programs (find out what is wrong and fix it)**.**

TEXT BOOKS:

1. R. Nageswara Rao, "Core Python Programming", Dreamtech.
2. Wesley J. Chun., "Core Python Programming", -2nd Edition Prentice Hall.
3. Kenneth A. Lambert, "The Fundamentals of Python: First Programs", 2011, Cengage Learning,

REFERCENCE BOOKS:

1. Luke Sneeringer, "Professional Python", Wrox.
2. John V Gutttag., "Introduction to Computation and Programming using Python", PHI.
3. Allen B. Downey, "Think Python", Green Tea Press, 2012.
4.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

SEMESTER IV

Course Title: Python programming lab | **Max Marks: 50**
Course Code: PCC-ITE-431 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

COURSE OBJECTIVES:

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

LIST OF PROGRAMS:

1. Write a program to demonstrate different number datatypes in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and accessing substring from a string.
4. Write a python script to print the current date in following format
5. Write a python script to use string methods
6. Write a python program to create, append and remove lists in python.
7. Write a program to demonstrate working with tuples in python
8. Write a program to demonstrate working with dictionaries in python
9. Write a program to check whether a number is oven or odd using if condition
10. Write a program to demonstrate for loop
11. Write a program to demonstrate while loop
12. Write a program to display prime numbers between 50 to 60
13. Write a program to display Fibonacci series
14. Write a program to display Armstrong number
15. Write a program to display address of variables
16. Write a program to implement Function in python
17. Function call with tuple and dictionary
18. Write a program to implement modules
19. Write a program to implement ladders and snake game
20. Write a program to implement dir function in modules
21. Write a program to explore math module
22. Write a program to explore datetime module
23. Write a program to explore lambda functions
24. Write a program to implement linear search

COURSE OUTCOME: Upon completion of the course, students will be able to:

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course content

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SEMESTER IV

Course Title: Database Management System Lab **Max Marks: 50**
Course Code: PCC-ITE-432 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Objectives:

The major objective of this lab is to provide a strong and formal foundation in database concepts, technology and practice to the participants, to groom them into well-informed database application developers.

List of experiments:

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario.
    a. Two assignments shall be carried out i.e. consider two different scenarios (e.g. bank, college)
2. Creating Database: Viewing all databases, creating a Database, viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback).
3. Table and Record Handling: INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements.
4. Retrieving Data from a Database: The SELECT statement, Using the WHERE clause, Using Logical Operators in the WHERE clause, Using IN, BETWEEN, LIKE, ORDER BY.
5. Write SQL queries equivalent to relational algebra queries for a given set of relations.
6. Perform the following:
    a. Altering a Table, Dropping/Truncating/Modifying/Renaming Tables, Backing up / Restoring a Database.
7. For a given set of relation schemes, create tables and perform the following
    a. Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (GROUP BY and HAVING Clause), Queries involving- Date Functions, String Functions, Math Functions.
8. Join Queries- Inner Join, Outer Join
    a. Subqueries- With IN clause, With EXISTS clause
9. For a given set of relation tables perform the following
    a. Creating Views (with and without check option), Dropping views, Selecting from a
    b. view
10. Write a query to understand the concepts for ROLL BACK, COMMIT & SAVEPOINTS.
11. Database Management: Creating Column Aliases, Creating Database Users, Using GRANT, and REVOKE.

COURSE OUTCOMES: At the end of this course, the students will able to do following:

1. Understand the basis of SQL and PL/SQL.
2. Design and implementation of database for an application

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER IV

Course Title: Computer Networks Lab	**Max Marks: 50**
Course Code: PCC-ITE-433	**University Examination: 25**
Duration of Exam: 2 hours	**Internal Assessment: 25**

Objectives:

1. To understand working principle of various communication protocols
2. To analyze various routing protocols
3. To know the concept of various data transfer between nodes.

List of experiments:

1. Networks Cabling (Theoretical)
2. Networks Cabling (Practical)
3. Study of networking devices in detail.
4. Study of basic network command and network configuration commands.
5. Connect the computers in LAN.
6. Building a LAN with HUBs and Switches
7. IP Addressing and subnetting.
8. Introduction to Packet Tracer.
9. Performing an initial Switch configuration.
10. Performing an initial Router configuration.
11. Configuring a default route.
12. Configuring a static and default route.
13. Implementation of RIP using Packet Tracer
14. Implementation of OSPF using Packet Tracer

Course Outcome: At the end of this course, the students will able to do following:

1. Understand fundamentals underlying of computer networks.
2. Understand details and functionality of computer network layered architecture
3. Compare routing networks.
4. Analyze performance of various communication protocols.

Note: These are only the suggested list of practical. Instructor may add or change some Practical relevant to the course contents.

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SEMESTER IV

Course Title: Capstone Project -II **Max Marks: 50**
Course Code: PROJ-ITE-431 **University Examination: 0**
Internal Assessment: 50

Course Objectives: To facilitate the students learn and apply an engineering design process in Information Technology & Engineering, including project resource management. As a part of a team, the students will make a project, that emphasizes, hands-on experience, and integrates analytical and design skills. The idea is to provide an opportunity to the students to apply what they have learned throughout the course of graduate program by undertaking a specific problem.

Course Description Capstone Project is increasingly interdisciplinary and requires students to function on multidisciplinary teams. It is the process of devising a system, component or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs." It typically includes both analysis and synthesis performed in an iterative cycle. Thus, students should experience some iterative design in the curriculum. As part of their design experience, students have an opportunity to define a problem, determine the problem scope and to list design objectives. The project must also demonstrate that students have adequate exposure to design, as defined, in engineering contexts. Engineering standards and realistic constraints are critical in engineering design. The program must clearly demonstrate where standards and constraints are taught and how they are integrated into the design component of the project. Each group will have 4-5 students. Each group should select their team leader and maintain daily diary. Each Group will work under mentorship of a faculty supervisor. Each group must meet the assigned supervisor (2hrs slot/week) till the end of the semester (record of attendance will be maintained), as per the time slot which will be provided to them by the respective supervisor. This is mandatory requirement for the fulfilment of the attendance as well as the successful completion of the project. The faculty supervisor of the project will continuously assess the progress of the works of the assigned groups.

Course learning outcomes (CLOs): After the completion of the course, the student will be able to:

1. Develop skills necessary for structuring, managing, and executing the projects.
2. Design, develop, debug, document, and deliver a project and learn to work in a team environment.
3. Develop written and oral communication skills.
4. Become proficient with software development tools and environments
5. Apply interdisciplinary knowledge to engineering design solutions, taking into account professional and ethical issues.

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SEMESTER V

Course Title: Theory of Automata **Max Marks: 100**
Course Code: PCC-ITE-521 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of abstract models of computation.

UNIT-I

INTRODUCTION**:** Alphabets, Strings and Languages; Automata and Grammars.
Machines: Basic Machine, FSM, Transition Graph, Transition Matrix, Deterministic and Non-Deterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore Machines, Minimization of Finite Automata, Two-Way Finite Automata.

UNIT-II

REGULAR SETS AND REGULAR GRAMMARS**:** Regular Sets, Finite Automata and Regular Expression, Pumping Lemma and Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets.

Formal Grammars & Languages: Basic Definitions and Examples of Languages, Chomsky Hierarchy, Regular Grammars, Context Free & Context Sensitive Grammars, Normal Forms - CNF and GNF.

UNIT-III

PUSHDOWN AUTOMATA**:** Formal Definition, Behaviour and Graphical Notation, Instantaneous Descriptions and Language of PDA. Equivalence of PDAS and CFGS.

Linear Bounded Automata: Context Sensitive Language and Linear Bounded Automata

UNIT-IV

TURING MACHINES**:**TM Model, Representation and Languages, Acceptability of TM. Design of TM, Church-Turing Thesis, Universal Turing Machine & Other Modification, Composite & Iterated TM.

UNIT-V

Computability: Basic concepts, Recursion, Partial, Total Recursive and Primitive Recursive Functions, Decidability.

Undecidability: Turing Machine Languages, Properties of recursive & recursively enumerable languages, Universal Turing machine and undecidable problem, Halting Problem, Post Correspondence Problem, Rice's theorem.

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COURSE OUTCOMES:

1. Write a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language.
3. For a given language determine whether the given language is regular or not.
4. Design context free grammars to generate strings of context free language
5. Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
6. Write the hierarchy of formal languages, grammars and machines.
7. Distinguish between computability and non-computability and Decidability and undecidability

TEXT BOOKS:

1. J Hopcroft, JD Ullman, R Motwani, Introduction to Automata Theory, Languages and Computation, 3rd Ed., Pearson, 2008
2. Michael Sipser, Introduction to Theory of Computation, 3rd Edition, Course Technology, 2012
3. Xavier S. P. E.,Theory of Automata and Formal Languages, New Age Intl.2005 Ed.

REFERENCE BOOK:

1. E. V. Krishnamurthy, Introductory Theory of computer science. 2.K. L. P. Mishra, Theory of computer Science, Prentice Hall of India Pvt. Ltd.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER V

Course Title: Internet and Web Technologies **Max Marks: 100**
Course Code: PCC-ITE-522 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: The objective of this subject is to understand about Website Development and internet.

UNIT-I:
Internet & HTML: History and growth of Internet, Introduction to WWW, HTTP, Web Architecture, Web Browsers and Search Engines, Static, Dynamic and active websites and their applications, web hosting. HTML: Introduction to HTML, Overview, Tags, Elements, Attributes, Heading, Paragraphs, Styles, Colours, Links, Images, Tables, frames and forms, Overview of DHTML.

UNIT-II:
Cascading Style Sheets (CSS): Text or font properties, background, border, margin, padding properties, Align, Navigation Bar, Drop downs, Image Gallery, page layout properties and user interface properties

UNIT-III:
JavaScript: Functions- Introduction, Program Modules in JavaScript, Programmer-Defined Functions, Function Definitions, Random-Number Generation, Example: Game of Chance, Duration of Identifiers, Scope Rules, JavaScript Global Functions, Recursion, Example Using Recursion: Fibonacci Series, Recursion vs. Iteration, JavaScript Internet and World Wide Web Resources. JavaScript arrays, JavaScript objects.

UNIT-IV:
Extensible Markup Language (XML)- Introduction, Structuring Data, XML Namespaces, Document Type Definitions (DTDs) and Schemas, Document Type Definitions, W3C XML Schema Documents, XML Vocabularies, Document Object Model (DOM), DOM Methods, Simple API for XML (SAX), Extensible Style sheet Language (XSL), Simple Object Access Protocol (SOAP), Internet and World Wide Web Resources,

UNIT-V:
Introduction to Server-Side Programming: Web Servers (IIS, PWS and Apache)-Introduction, HTTP Request Types, System Architecture, Client-Side Scripting versus Server-Side Scripting, PHP, Overview, variable, Control statements, Arrays, functions and forms, advanced PHP. MySQL Database Connectivity.

COURSE OUTCOME:
1. Develop simple static websites.

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2. Static websites with CSS.
3. Dynamic websites using Java Scripting.
4. Develop XML parsers
5. Dynamic website with server-side scripting using PHP.

TEXT BOOKS:

1. Thomas Powell, Complete Reference HTML/XHTML.
2. S. AchyutGodbole and AtulKahate, Web Technologies, Tata McGraw Hill.
3. Raj Kamal, Internet & Web Design, Tata McGraw Hill.

REFERENCE BOOKS:

1. H.M.Deitel, P.J.Deitel and T.R.Nieto, Internet and World Wide Web: How to Program,Pearson Education, 2000
2. Xavier C., Web Technology & Design, New Age International Publishers.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER V

Course Title: Software Engineering | **Max Marks: 100**
Course Code: PCC-ITE-523 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVES: The program's goal is to provide a professionally guided education in software engineering that prepares graduates to transition into a broad range of career options: industry, government, computing graduate program, and professional education.

UNIT-I

Introduction to Software:

Definitions to know the meaning of Software Engineering. Need to discuss Importance of software engineering, The Software evolution, Software characteristic, Goals of Software Engineering, Software development life-cycle: Requirement analysis, software design, coding, testing and maintenance.

UNIT-II

Software Models and Software requirement Specification

Water fall Model: Introduction, Diagram, Characteristics, Strengths. Weakness Prototyping model: Diagram, Characteristics, and Strengths Weakness. Iterative development model: Diagram, Characteristics, Strengths, Weakness. Spiral model: Diagram, Characteristics, Strengths, Weakness.

Types of requirements, functional and non-functional requirements, requirement engineering,requirement engineering process. Requirements elicitation, Requirement Validation, SRS Document –Goals, properties and characteristics of SRS documents,

UNIT-III

System Design: What is software design, Importance of design, objective of design and comparison of good and bad design, Design framework, Problem partitioning, Abstraction, Top down and Bottom up – design, Cohesiveness, coupling

UNIT-IV

Coding: Top-down and bottom-up, structure programming, information hiding, and programming style.

Testing: Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, Software testing strategies, Verification and validation, Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta

UNIT-V

Software Maintenance: Software maintenance definitions, need for software maintenance, categories of maintenance, software maintenance process models, techniques for reducing need of software maintenance.

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COURSE OUTCOMES: At the end of this course, the students will able to,

1. Learn about the phases in software development cycle
2. To understand various types of models and requirements engineering
3. To understand the design principles.
4. Learn about the levels of testing and testing approaches
5. Learn about the maintenance model.

TEXT BOOKS:

1. **Peters**, Software Engineering, Wiley India.
2. **PankajJalote**, An integrated Approach to Software Engineering, Narosa Publishing.

REFERENCE BOOKS:

1. **Thompson**, Software Engineering Project management, Wiley India.
2. **Richard Fairley**, Software Engineering, TMH.

Note for paper setter: The question paper shall comprise of 10 questions. Twoquestions will be set from each unit. The student has to attempt five questions selectingat least one question from each unit.

SEMESTER V

Course Title: Machine Learning **Max Marks: 100**
Course Code: PCC-ITE-524 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES:

1. To be able to formulate machine learning problems corresponding to different applications.
2. To understand a range of machine learning algorithms along with their strengths and weaknesses.
3. To understand the basic theory underlying machine learning.

UNIT I:

INTRODUCTION: Introduction: Well-Posed learning problems, Basic concepts, Designing a learning system, Issues in machine learning. Types of machine learning: Learning associations, Supervised learning (Classification and Regression Trees, Support vector machines), Unsupervised learning (Clustering), Instance-based learning (K-nearest Neighbor, Locally weighted regression, Radial Basis Function), Reinforcement learning (Learning Task, Q-learning, Value function approximation, Temporal difference learning).

UNIT II:

Decision Tree Learning: – Decision tree representation, appropriate problems for decision tree learning, Univariate Trees (Classification and Regression), Multivariate Trees, Basic Decision Tree Learning algorithms, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

UNIT III:

Bayesian Learning: Bayes theorem and concept learning, Bayes optimal classifier, Gibbs algorithms, Naive Bayes Classifier, Bayesian belief networks, The EM algorithm. Genetic Algorithms: Basic concepts, Hypothesis space search, Genetic programming, Models of evolution and learning, Parallelizing Genetic Algorithms

UNIT IV:

Neural network representation, Neural Networks as a paradigm for parallel processing, Linear discrimination, pairwise separation, Gradient Descent, Logistic discrimination, Perceptron, Training a perceptron, Multilayer perceptron, Back propagation Algorithm. Recurrent Networks, dynamically modifying network structure.

UNIT V:

Design and Analysis of Machine Learning Experiments: Guidelines for machine learning experiments, Factors, Response, and Strategy of experimentation, Cross-Validation and Resampling methods, measuring classifier performance, Hypothesis testing, Assessing a classification algorithm's performance, Comparing two classification algorithms, Comparing multiple algorithms: Analysis of variance, Comparison over multiple datasets.

COURSE OUTCOMES:

1. Student should be able to understand the basic concepts
2. Ability to formulate machine learning techniques to respective problems.
3. Apply machine learning algorithms to solve problems of moderate complexity.
4. Apply supervised and unsupervised learning to analyse data.
5. Analyse machine learning models.

TEXT BOOKS:

1. Tom Michel, Machine Learning. McGraw Hill. 1997
2. Trevor Hus tie, Robert Tibshirani & Jerome Friedman. The Elements of Statically Learning, Springer Veriag 2001

REFERENCE BOOKS:

1. William W Hsieh, Machine Learning Methods en the Environmental Science, Neural Network, Cambridge University Press.
2. Richard o Duda, Peter E. Hart and David G. Stork, & pattern Classification, John Wiley & Sons Inc,2001.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-V

Course Title: Internet and Web Technologies Lab **Max Marks: 50**
Course Code: PCC-ITE-531 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

COURSE OBJECTIVE: This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.

LIST OF EXPERIMENTS:

1. Designing web pages using HTML.
2. Designing web pages using HTML and CSS.
3. Design of interactive web pages using JavaScript.
4. Design of interactive web pages using Ajax.
5. Creating simple webpage using PHP.
6. Designing web applications using PHP and MySQL.

COURSE OUTCOME:

1. Analyze a web page and identify its elements and attributes.
2. Create web pages
3. Build dynamic web pages using java scripts
4. Create XML documents and schemes

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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SEMESTER-V

Course Title: Software Engineering Lab **Max Marks: 50**
Course Code: PCC-ITE-532 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Course Objective: It aims to develop a broad understanding of the discipline of software engineering. It seeks to complement this with a detailed knowledge of techniques foe analysisand design of complex software intensive systems.

Suggestive list of practical's related to software Engineering (without coding) :

1. Performing Case studies related to various stages of Software development Life cycle
2. Preparing User requirement for a software.
3. Writing System requirement specification.
4. Performing analysis of the user requirement.
5. Preparing designs of software using tools such as flow charts, DFD, UML diagrams.
6. Preparing test cases of sample programs

Course Outcomes:

1. Plan a software engineering process life cycle
2. Able to elicit, analyse and specify software requirements.
3. Analyse and translate a specification into design.
4. Realize design practically, using an appropriate software engineering methodology

Note: This is only the suggested list of experiments. Instructor may add or change someexperiments relevant to the course contents.

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SEMESTER-V

Course Title: Machine learning Lab **Max Marks: 50**
Course Code: PCC-ITE-533 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

COURSE OBJECTIVE: To introduce students to the basic concepts and techniques of Machine Learning. To develop skills of using recent machine learning software for solving practical problems. To gain experience of doing independent study and research.

LIST OF EXPERIMENTS:

1. Study and Implement the Naive Bayes learner using WEKA
2. Study and Implement the Decision Tree learners using WEKA
3. Estimate the accuracy of decision classifier using 5-fold cross-validation. (You needto choose the appropriate options for missing values).
4. Estimate the precision, recall, accuracy, and F-measure of the decision tree classifier on the text classification task for each of the 10 categories using 10-fold cross- validation.
5. Develop a machine learning method to classifying your incoming mail.
6. Develop a machine learning method to Predict stock prices based on past price variation.
7. Develop a machine learning method to predict how people would rate movies, books, etc.

COURSE OUTCOMES:

1. To develop a deeper understanding of several major topics in machine learning
2. To develop the design and programming skills that will help you to build intelligent,adaptive artefacts.
3. To develop the basic skills necessary to pursue research in machine learning.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

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SEMESTER V

Course Title: Concrete Technology	**Max Marks: 100**
Course Code: OEC-ITE-521/PEC-CE-524	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: Concrete is the most important civil engineering material, often used with steel reinforcement. The course aims to give details about composition of concrete and its characteristics.

UNIT I

Concrete and its Ingredients: Concrete, Properties of ingredients, tests, Production of concrete, mixing, compaction curing, Properties of fresh concrete, Defects in Concrete, Concrete additives.

UNIT II

Properties of Concrete: Behaviour of concrete in tension and compression, shear and bond, Influence of various factors on test results, Time dependent behaviour of concrete -creep, shrinkage and fatigue.

UNIT III

Concrete Mix Design: Concrete mix design; Proportioning of concrete mixes, basic considerations, cost specifications, factors in the choice of mix proportion, different method of mix design.

UNIT IV

Concrete Operations and transportation: Concrete manufacturing methods(Batching plants) ,transportation(transit mixtures, concrete pumps) ,Quality control, Behavior of concrete in extreme environment; temperature problem in concreting, hot weather, cold weather and under water conditions, Resistance to freezing sulphate and acid attack, efflorescence, fire resistance; Inspection and testing of concrete-Concrete cracking, types of cracks, causes and remedies Non-destructive tests on concrete, Chemical tests on cement and aggregates.

UNIT V

Admixtures and Special Concretes: Admixtures and their uses, Special concrete; types and specifications, Fibre reinforced and steel Fibre reinforced concrete, Polymer concrete, Deterioration of concrete and its prevention Repair and rehabilitation.

Outcome: After successfully studying this course, students will

1. Identify the suitability of materials for the construction works.
2. Able to understand the properties of concrete
3. Able to design the concrete mix design with using different methods of mix design.
4. Implement the special concreting methods required for Cold weather and Hot weather regions.
5. Able to understand the importance of admixture in concrete design.

Text Books:

1. **Neville. A M**: Properties of Concrete.
2. **Kulkarni, PD, Ghosh, RK and Phull, YR**: "Text Book of Concrete Technology";New Delhi Oxford and IBH Publishing Co.
3. **Gupta BL and Gupta Amit**: "Text Book of Concrete Technology"; Standard Publishers Distributors, Delhi.

Reference Books:

1. **Varshney, RS:** "Concrete Technology"; New Delhi, Oxford and IBH Publishing
2. **M.S. Shetty**: Concrete Technology.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER V

Course Title: Internet of Things **Max Marks: 100**
Course Code: OEC-ITE-522/PEC-CSE-722 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course objectives: The main objectives of this course are:

1. To assess the vision and introduction of IoT.
2. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
3. To Understand State of the Art - IoT Architecture.
4. To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Unit-I

Introduction to Internet of Things - What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.

Unit -II

IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security

Unit-III

IoT Architecture: IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.

Unit-IV

Web of Things - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.

Unit-V

IoT Applications: IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Course Outcomes: After completion of this course, the students will able to do following:

1. Interpret the vision of IoT from a global context.
2. Compare and contrast the use of Devices, Gateways and Data Management in IoT.
3. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
4. To study and analyse data and to understand the security issues in IoT
5. To study IoT physical devices and end points and to understand the communications between components

Textbook:

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1. **Honbo Zhou**, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012.
2. **Dieter Uckelmann, Mark Harrison, Michahelles, Florian** (Eds), "Architecting the Internet of Things", Springer, 2011.
3. **David Easley and Jon Kleinberg**, "Networks, Crowds, and Markets: Reasoning About a HighlyConnected World", Cambridge University Press, 2010.
4. **Olivier Hersent, David Boswarthick, Omar Elloumi** , "The Internet of Things – Key applicationsand Protocols", Wiley, 2012.

Reference Books:

1. **Vijay Madisetti and Arshdeep Bahga**, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014
2. **Francis da Costa**, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
3. **CunoPfister**, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1- 4493-9357-1

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER V

Course Title: Fundamentals Of Digital Image Processing	**Max Marks: 100**
Course Code: OEC-ITE-523/PCC-CSE-721	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: To introduce the different low level and high level computer vision techniques. Students are also made aware about the different image processing techniques.

Unit-I

Introduction to Image Processing: Digital Image Representation, Sampling & Quantization Fundamental Steps in Image Processing, Elements of Digital Image Process Systems, Application of Digital Image Processing, Relationship between Pixels. Brief Introduction to Image Data Types and File Formats, Intensity transform functions, Histogram processing.

Unit–II

Image Filtering: Spatial domain filtering, Fourier domain analysis**:** Fourier transforms and its properties, frequency domain filters, Homomorphism Filtering.

Unit-III

Image Compression: Coding redundancy, Inter-pixel redundancy, Psycho visual redundancy, Huffman Coding, Arithmetic coding, Run-Length coding, Lossy compression techniques, JPEG Compression.

Unit-IV

Image Morphological Processing: Introduction to basic operation on binary and grayscale images: Dilation, Erosion, Opening & Closing, Morphological Algorithms: Boundary & Region Extraction, Convex Hull, Thinning, Thickening, Skeletons, Pruning.

Unit-V

Image Segmentation, Representation & Descriptions: Point, Line and Edge Detection, thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Contour following, Boundary representations, Region Representations, shape properties, Boundary Descriptors, Regional Descriptors, Texture representations, Object Descriptions

Course Outcome

At the end of this course, students will demonstrate the ability to:

1. Have an understanding of various steps of Digital image Processing and image representation.
2. Understand and implement image enhancement in spatial domain and in frequency domain.
3. Understand image compression algorithms and choose an appropriate algorithm for specific application needs.
4. Understand and implement basic Morphological operation on Image.

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5. Understand and implement image segmentation, representation and description.

Text Books:

1. Gonzalez and Woods: Digital Image Processing ISDN 0-201-600- 781, Addison Wesley 1992.
2. Forsyth and Ponce: Computer Vision A Modern Approach Pearson Education Latest Edition.

Reference Book:

1. Pakhera Malay K: Digital Image Processing and Pattern Recognition, PHI.
2. Trucco & Verri: Introductory Techniques for 3-D Computer Vision, Prentice Hall, Latest Edition.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

SEMESTER V

Course Title: Power Engineering | **Max Marks: 100**
Course Code: OEC-ITE-524/PEC-EE-322 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: The objective of this course is to allow the students to grasp various methods of power generation, tariff calculations.

Detailed contents

Unit-1

Economic Aspects and Power Factor Improvement: Economics of generation, factors affecting the cost of generation, reduction of costs by interconnection of stations, curves useful in system operation, choice of size and number of generating units. Power factor disadvantages of low power factor, methods of improving power factor, location of power factor improvement apparatus, economics of power factor improvement.

Unit-II

Power Tariff: Cost of generating station, fixed capital, running capital annual cost running charges, fixed charges, methods of depreciation, factors influencing the rate of tariff, designing tariff, different types of tariff, flat rate tariff, block rate tariff, two part tariff maximum demand tariff, power factor tariff.

Unit-III

Thermal and Nuclear Power Plants: General layout, choice of site, super heater, air pre heater, economizer, coal handling plant, cooling towers, electrostatic precipitator, advantage and disadvantages. Introduction to nuclear energy, choice of site of the plant, advantages and disadvantages, main components of the plant and type of reactors.
Introduction to Diesel power stations and gas turbine plants.

Unit-IV

Hydroelectric power plants: Hydrology, load flow duration curve, hydro graph, mass curve, choice of site of the plant, advantages and disadvantages of the plant, layout of the plant, classification of the hydroelectric plant, introduction to mini & micro hydro.

Unit-V

Substations and Grounding: Neutral grounding, solid grounding resistance grounding, reactance grounding, are suppression coil grounding Earthing transformers, choice of methods of neutral grounding equipment, grounding for safety. Introduction to substations and substation equipment.

Course outcomes

This subject exposes. After the completion of this course student will be able to:

CO1. Understand economic aspects of power generation, transmission & transmission along with the advantages of power factor improvement.

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CO2. Analyze different costs associated with power systems and ways to reduce it analyze various tariffs schemes.

CO3. Understand the layout and design considerations of thermal and nuclear plants.

CO4. Understand the layout and design considerations of hydroelectric plants.

CO5. Understand various types of substation groundings.

Text Books/Reference:

1. **Deshpande M.V**., Elements of power station design, TMH.
2. **H. Pratab**, The art and Science of Utilisation of Electric energy, PHI.
3. **Satnam**, Substation Design and Equipment.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER V

Course Title: Data Analytics and Visualization	**Max Marks: 100**
Course Code: PEC-ITE-521	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Course Objectives: To learn the analysis of various types of data and its visualization using visualization tools.

Unit-I

Data Representation: Data Objects and Attribute Types: Nominal, Binary, Ordinal, Numeric, Discrete and Continuous, Types of data: Record, Temporal, Spatial Temporal, Graph, Unstructured and Semi structured data, Basic Statistical Descriptions of Data.

Unit-II

Introduction to Data Analysis: Probability and Random Variables, Correlation, Regression.
Data Analysis Pipeline: Data pre-processing- Attribute values, Attribute transformation, Sampling, Dimensionality reduction: PCA, Eigen faces, Multidimensional Scaling, Non-linear Methods, Graph-based Semi-supervised Learning, Representation Learning Feature subset selection, Distance and Similarity calculation.

Unit-III

Data Mining Techniques for Analysis: Classification: Decision tree induction, Bayes classification, Rule-based classification, Support Vector Machines, Classification Using Frequent Patterns, k-Nearest-Neighbour, Fuzzy-set approach Classifier,

Unit-IV

Data Mining Techniques for Analysis Clustering: K-Means, k-Medoids, Agglomerative versus Divisive Hierarchical Clustering Distance Measures in Algorithmic Methods, Mean-shift Clustering

Unit-V

Visualization: Traditional Visualization, Multivariate Data Visualization, Principles of Perception, Color, Design, and Evaluation, Text Data Visualization, Network Data Visualization, Temporal Data Visualization and visualization Case Studies.

Course learning outcomes (CLOs):

After the completion of the course, the student will be able to:

1. Analyze and extract features of complex datasets.
2. Evaluate and visualize inter-dependencies among variables in dataset.
3. Apply techniques for classification and clustering in datasets.
4. Develop and validate models for real life datasets.

Text Books:

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1. Han, J., Kamber, M. and Pei, J., Data Mining Concepts and Techniques, Morgan Kaufmann (2011) 3rd Edition
2. Peng, D., R., R Programming for Data Science (2012).

Reference Books:

1. Hastie, T., Tibshirani, R. and Friedman, J., The Elements of Statistical Learning, Springer (2009) 2nd Edition.
2. Simon, P., The Visual Organization: Data Visualization, Big Data, and the Quest for Better Decisions, John Wiley & Sons (2014).

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

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SEMESTER V

Course Title: Compiler Design | **Max Marks: 100**
Course Code: PEC-ITE-522 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: The main objectives of these courses are to give students hands-on experience with crafting a simple compiler, working on a sizable software engineering project, using modern software tools, and most importantly correlating theory with practice.

UNIT-I

INTRODUCTION TO COMPILER**:** Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Implementation of lexical analyzers, lexical-analyzer generator, Lex compiler, compiler construction tools, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

UNIT-II

BASIC PARSING TECHNIQUES**:** Parsers, Shift reduce parsing, operator precedence Parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR (0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables, constructing LALR sets of items.

UNIT-III

SYNTAX-DIRECTED TRANSLATION**:** Syntax-directed Translation schemes, Implementation of Syntax- directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser.

UNIT-IV

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SYMBOL TABLES**:** Data structure for symbols tables, representing scope information. Run- Time Administration: Implementation of simple stack allocation scheme, storage allocation inblock structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phaseerrors semantic errors.

UNIT-V

INTRODUCTION TO CODE OPTIMIZATION**:** Loop optimization, the DAG representationof basic blocks, value numbers and algebraic laws, Global Data-Flow analysis. Implementation of a subset of C using YACC.

COURSE OUTCOME:

1. Master using lexical analyzer and parser generator tools.
2. Master building symbol tables and generating intermediate code.
3. Master generating assembly code for a RISC machine.
4. Master programming in Java.
5. Be familiar with compiler architecture.
6. Be familiar with register allocation.
7. Be exposed to compiler optimization

TEXT BOOK

1. **Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman.** "Compilers Principles, Techniques andTools". Pearson Education, 2008

REFERENCES:

1. **Aho, Sethi& Ullman,** "Compiler Design", Addision Wesley/ Pearson.
2. **O. G. Kakde**; Compiler Design,4/e; Universities Press (2008)

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

SEMESTER V

Course Title: Advance Algorithms **Max Marks: 100**
Course Code: PEC-ITE-523 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES:

1. To provide the foundations of the practical implementation and usage of Algorithms and Data Structures. One objective is
2. To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of algorithms and data structures for different kinds ofproblems.
3. To expose the student to the algorithm analysis techniques, to the theory of reductions, and to the classification of problems into complexity classes like NP.

UNIT- I

ALGORITHM ANALYSIS**:** Asymptotic Notation, Amortization Basic Data Structure: Stacksand Queues, Vectors, Lists and Sequences, Trees, Priority Queues, Heaps, Dictionaries and Hash Tables Search Trees and Skip Lists: Ordered Dictionaries and binary Search Trees, AVLtrees, Bounded-Depth Search Trees.

UNIT-II

FUNDAMENTAL TECHNIQUES**:** The Greedy Method, Divide and Conquer, Dynamic Programming Graphs: The Grpah abstract data Type, Data Structures for Graphs, Graph Traversal, Directed Graphs.

UNIT-III

WEIGHTED GRAPHS**:** Single Source Shortest Paths, All pairs Shortest Paths, Minimum Spanning Trees Network Flow and Matching: Flows and Cuts, Maximum Flow, Maximum Bipartite Matching, Minimum Cost Flow

UNIT-IV

TEXT PROCESSING**:** Strings and Pattern Matching algorithms, Tries, Text Compression, Text Similarity testing. Number Theory and Cryptography: Fundamental Algorithms involving numbers, Cryptographic Computations, Information Security Algorithms and Protocols.

UNIT-V

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COMPUTATIONAL GEOMETRY**:** Range Trees, Prority Search Trees, Quadtrees and k-dTrees, Convex Hulls, N-P Complete.

COURSE OUTCOMES:

1. Basic ability to analyze algorithms and to determine algorithm correctness and timeefficiency.
2. Master a variety of advanced abstract data type (ADT) and data structures and theirimplementations.
3. Master different algorithm design techniques (brute-force, divide and conquer, greedy,etc.)
4. Ability to apply and implement learned algorithm design techniques and datastructures to solve problems.

TEXT BOOKS:

1. **T.H. Cormen, C.E.Leiserson and R.L. Rivest,** Introduction to Algorithms.
2. **G.Brassard and P.Bratley**, Fundamentals of Algorithmics.

REFERENCE BOOKS

1. **S. Dasgupta, C. Papadimitrou, U Vazirani,** Algorithms, by McGraw Hill.
2. **J. Klienberg and E. Tardos,** Algorithm Design, by Pearson Education Limited.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

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SEMESTER VI

Course Title: Computer Graphics & Multimedia **Max Marks: 100**
Course Code: PCC-ITE-621 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: To understand the basics of various inputs and output computer graphics hardware devices. Exploration of fundamental concepts in 2D and 3D computer graphics. To know 2D raster graphics techniques, 3D modeling, geometric transformations, 3D viewing.

UNIT–I
BASIC OF COMPUTER GRAPHICS: Introduction to computer graphics, Applications of computer graphics, Display devices, Raster scan systems, Graphics input devices, Graphics software and standards.

UNIT–II
GRAPHICS PRIMITIVES: Points, lines, circles as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes.

UNIT–III
2D TRANSFORMATIONS AND VIEWING: Transformations, matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping, polygon clipping.

UNIT–IV
3D TRANSFORMATIONS & INTRODUCTION TO CURVES: curved lines and surfaces, spline representation, cubic spline interpolation methods, Bezier curves and surfaces, B-spline curves. 3D transformations: 3D scaling, rotation and translation, composite transformation, Projection: parallel and perspective.

UNIT–V
INTRODUCTION TO MULTIMEDIA: Introduction to multimedia, Multimedia computer system, Multimedia components, Multimedia terminology: communication modes, media types, Multimedia networks, Applications of multimedia, distributed multimedia systems, Synchronization

COURSE OUTCOMES

1. Explain various applications of computer Graphics.
2. To be able to understand a graphics processing system.
3. To able to under and implement computer graphics algorithms.
4. To be able to implement 3D graphics primitives
5. To be able to understand and use multimedia aids.

TEXT BOOKS:

1. Steven Harrington, Computer Graphics, A programming approach second Edn.
2. Computer Graphics; Principles and practice; Second Edition in C; J. D. Foley, A.Van Dam, S. K. Feiner and J. F. Hughes; Addison Wesley, 1997.

REFERENCE BOOKS:

1. Rogers, Procedurals elements of Computer Graphics, McGraw hill.

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2. Newman and Sproul, Principle of interactive Computer Graphics, McGraw Hill.
3. John F. Koegel Buford, Multimedia Systems, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER VI

Course Title: Cryptography and Network Security **Max Marks: 100**
Course Code: PCC-ITE-622 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: To understand the principles of encryption algorithms: conventional and cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

UNIT-I
INTRODUCTION: Introduction to security, need of security, security attacks, services and mechanisms, introduction to cryptology. conventional encryption model, classical encryption techniques substitution ciphers & transposition ciphers, cryptanalysis, steganography.

UNIT-II
MODERN BLOCK CIPHERS**:** Ideal block ciphers fiestel structure, principles, standards (des), strength of des, differential & linear cryptanalysis of des, block cipher modes of operation, triple des, aes encryption & decryption, key distribution, random number generation.

UNIT-III
PUBLIC KEY CRYPTOGRAPHY: Principle of public key cryptography, prime and relative prime numbers, modular arithmetic, key management. diffie-hellman key exchange, elliptic curve architecture and cryptography. introduction to number theory, rsa.

UNIT-IV
AUTHENTICATION AND HASH FUNCTION**:** Authentication Recruitment's, Authentication Functions and Message Authentication Codes. Digital Signatures, MD5 Message Digest Algorithm. Secure Hash Algorithm-I (SHA-1).

UNIT-V
NETWORK SECURITY & SYSTEM LEVEL SECURITY: Electronics Mail Security: Pretty Good Privacy (PGP), S/MIME IP Security: IP Security Overview, Architecture, and Authentication Header. Web Security: Security Socket Layer & Transport Layer Security, System Security: Intruders, Viruses and Related Threats, Firewall Design Principles.

COURSE OUTCOME: At the end of the course the students will be able to dofollowing:

1. Understand cryptography and network security concepts and application.
2. Apply security principles to system design.
3. Identify and investigate network security threat.

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4. Analyses and design network security protocols.
5. Conduct research in network security.

TEXT BOOK:

1. **William Stallings**, Cryptography and network security: principles and practices. Pearson Education India, 2006.
2. **Behrouz A. Forouzan, and Debdeep Mukhopadhyay.** Cryptography and Network Security (Sie). McGraw-Hill Education, 2011.

REFERENCE BOOKS:

1. **Kaufman C., Perlman R. & Spenser M**., Network Security, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions willbe set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER VI

Course Title: Unix/Linux and shell programming	**Max Marks: 100**
Course Code: PCC-ITE-623	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Course Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, overview of the concept of buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipesystem call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes: process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control: process creation, signals, process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell.Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: InterProcess communication, process tracing, network communication, sockets, Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores.

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Understanding the concept of shell programming
2. Understanding the working of kernel and implementing them.
3. Implementing the system calls, process management, and inter process communication
4. Understand Shell Programming and its implementation.
5. Understanding Semaphores along with interprocess communication.

Text Books:

1. **Maurice J Bach.,** The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S. Eric**, The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,** Advanced Unix Programming.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMSETER-VI

Course Title: Computer Graphics & multimedia Lab **Max Marks: 50**
Course Code: PCC-ITE-631 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

OBJECTIVE: The objective of the laboratory is to support research and education of students in the fields of Multimedia Technology.

LIST OF EXPERIMENTS:

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham‟s Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham‟s Algorithm.
5. To implement polygon boundary fill algorithm.
6. To implement polygon flood fill algorithm.
7. To translate an object with translation parameters in X and Y directions.
8. To scale an object with scaling factors along X and Y directions.
9. To rotate an object with a certain angle.
10. To perform composite transformations of an object.
11. Implementation of simple graphics animation.
12. Practice on Multimedia Tools

COURSE OUTCOME: At the end of this course, the students will able to do following:

1. Design and implementation of various algorithms to draw a number of shapes
2. Design and implementation of various algorithms for designing animation graphics and composite objects
3. Design and simulation of various algorithms using multimedia tools

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

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SEMESTER-VI

Course Title: Unix/Linux & Shell programming Lab **Max Marks: 50**
Course Code: PCC-ITE-632 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

OBJECTIVE: The lab course will address the demand for Information technology professionals with UNIX training and experience.

LIST OF EXPERIMENTS:

1. Using the visual editor (vi) and the Picoeditor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administrationissues.
8. Practising various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web serverconfiguration.

Course Outcomes:

1. **Upon completion of this course, the student will be ableto:**
2. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operatingsystem).
3. You will be able to run C / C++ programs on UNIX.
4. You will be able to do shell programming on UNIXOS.
5. You will be able to understand and handle UNIX system calls.

Note: This is only the suggested list of experiments. Instructor may frameadditional experiments relevant to the course contents

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SEMESTER-VI

Course Title: Mobile and Wireless Communication	**Max Marks: 100**
Course Code: OEC-ITE-621/PEC-ECE-621	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies

Unit-I

Cellular Mobile Radio Systems: Introduction to Cellular Mobile System, evolution of mobile communication systems, Performance criteria, operation of cellular systems, The cellular Concept: Frequency reuse; The basic theory of hexagonal cell layout; Spectrum efficiency. FDM/TDM Cellular systems; Cell splitting and cell sectoring, hand off.

Unit-II

Interference: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, fading in mobile environment, inter symbol interference (ISI) and rejection using Near-Maximum Likelihood detection.

Unit-III

Wireless Communication: Major challenges in wireless communication, Radio propagation characteristics; Propagation mechanisms: Reflection, Diffraction and scattering, Effect of human made structures, phase difference between direct and reflected paths, Multipath propagation, Models for path loss, Shadowing and multipath fading (delay spread, coherence bandwidth, coherence time, Doppler spread).

Unit-IV

Multiple Access Techniques & Wireless Systems: Multiplexing techniques- FDMA, TDMA and CDMA. Spread spectrum systems: Frequency hopping multiple access and its principle, Code division multiple access-principle behind CDMA, Basic principle behind the Direct Sequence Spread Spectrum.

Unit-V:

OFDM and Multi antenna Systems: Introduction and Principle of OFDM, Orthogonality and its Physical significance, Implementation of transceivers, cyclic prefix, Advantages and disadvantages of OFDM, OFDMA. Smart Antennas, MIMO-Basic Introduction and system model.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system, formulate its performance criteria.
- **CO2.** Characterize the trade-off among frequency reuse, signal to interference ratio, capacity& able to understand interferences in cellular communication.
- **CO3.** Apply the knowledge of mathematics to find out the average received signal strength at a distance from the transmitter using different propagation model.

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CO4. Identify the advantages & disadvantages of different mobile antennas.

CO5. Understand multiple access method, spread spectrum techniques, wireless communication system.

Text Books:

1. **Lee-** Mobile Cellular Telecommunications, McGraw Hill, 2nd Edition, 1989.
2. **Theodore, Rapport**-Wireless Communications Pearson education, 2nd Edition, 2002.

Reference Books:

1. **Blake R-** Wireless Communication Technology, Thompson Asia Pvt. Ltd., 2004.
2. **Mark Jon W and Weihua Zhqung -**Wireless Communication and Networking, PHI, 2005.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

SEMESTER-VI

Course Title: Neural Networks	**Max Marks: 100**
Course Code: OEC-ITE-622/PEC-CSE-824	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Course Objective: The principal objective of this subject is to introduce students to neural networks and fuzzy theory from an engineering perspective

Unit-I

Introduction: Historical Perspective, Basic Neurobiology, Why Artificial Networks? Network Architectures, the Tasks Neural Networks Can Perform, Characteristics of Neural Networks

Unit-II

Basic Neuron Models: Mcculloch-Pitts Model, Radial Basis Function Model, etc, Learning Algorithms. Matlab Simulation Exercises.

Unit-III

Basic Neural Network Models: The Hebbian Hypothesis. Single-Layered Neural Networks, Multilayer Perceptron, Nearest Neighbor Based Multilayer Perceptron, Training of Artificial Neural Networks

Unit-IV

Basic Learning Algorithms: Supervised Learning, Constructive Algorithms, Single-Hidden Layer Algorithms. The Upstart Algorithm. The Cascade Correlation Algorithm. Neural Networks and Temporal Sequences. Sequence Recognition. Sequence Generation. Unsupervised Learning. Competitive Learning. The Back Propagation Algorithm, Self-Organization Learning, Winner-Take- All Competitive Learning, Evolutionary Learning.

Unit-V

Applications: Character Recognition, Signal Restoration, Pattern Recognition. Matlab Simulation Exercises.

Course Outcomes:

At the end of the course, students should be able to understand and appreciate:

1. The role of neural networks in engineering, artificial intelligence, and other areas.
2. Understanding of basic neural network
3. Understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
4. Able to evaluate whether neural networks are appropriate to a particular application.
5. Able to apply neural networks to particular applications, and to know what steps to take to improve performance.

Text Books:

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1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS PublishingCompany, (2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.

Reference Books:

1. **Valluru Rao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co*(1998)*
2. **Freeman**, Neural Networks, Pearson Publication (2003).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER-VI

Course Title: Renewable Energy Sources | **Max Marks: 100**
Course Code: OEC-ITE-623/PEC-EE-421 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: The course is designed to give knowledge of various renewable energy sources, systems and applications in the present context and need.

Unit-I

Energy Scenario in India, Renewable and Non-renewable Energy sources, Causes of Energy Scarcity, Solution to energy Scarcity, Need for Renewable Energy, Advantages and Disadvantages of Renewable energy, Renewable Energy statistics worldwide and India.

Unit-II

Solar energy, solar photovoltaic, PV Technologies-Amorphous, Monocrystalline, polycrystalline-I characteristics of a PV cell, PV module, array, Maximum Power Point Tracking (MPPT) algorithms, Concentrated Solar Power, types of collectors, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, Application of Solar Power, Economic Policies to Promote Solar Energy.

Unit-III

Introduction, Electricity Generation using Wind Energy Generators (WEG), Evaluating Wind Turbine Performance, Wind Potential, Wind Energy in India, Wind Turbine Size and Power Ratings, Advantages of Wind-Generated Electricity, Cost Issues, Environmental Concerns, Supply and Transport Issues.

Unit-IV

Bio energy, Types of Bio Gas Plants, tidal energy, classification of Tidal Plants, Geothermal Power plants, ocean thermal energy systems, Open OTEC Cycle, Closed OTEC Cycle. Introduction to Magneto Hydro Dynamics (MHD) Power & fuel cells, types of fuel cells.

Unit-V

Energy storages: Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome:

After learning the subject, student will be able to:

CO1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources

CO2. Demonstrate the knowledge of physics of solar power generation and the associated issues.

CO3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.

CO4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.

CO5. Demonstrate the ways by which energy can be stored indifferent forms.

TEXT BOOKS/REFERENCES:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
2. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
3. Non-conventional energy resources, Shobh Nath Singh, Pearson India
4. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
5. Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER-VI

Course Title: Antenna and Wave Propagation	**Max Marks: 100**
Course Code: OEC-ITE-624/PEC-ECE-623	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to antenna field. Emphasis is given to latest technologies and recent trends.

Unit-I

Introduction to Antennas: Radiation Fundamental, Retarded Potential, induction and radiation fields, radiated power from a current element, short antennas, Radiation from a quarter wave monopole and half wave dipole.

Unit-II

Fundamentals of Antennas & Arrays of Antennas: Basic ideas of reciprocity properties of antennas, Radiation resistance, Radiation patterns, directional properties of dipole antennas. Antenna gain, Antenna aperture and its relation to gain, antenna terminal impedance, Antenna temperature and signal to noise ratio.

Antenna Arrays -Arrays of two point sources, linear arrays of n-point sources. Broadside and end fire arrays, pattern multiplication, effect of earth on vertical and horizontal patterns, Binomial array.

Unit-III

Special Purpose Antennas -Reflector type antennas, Lens antenna, V and Rhombic antennas, Yagi antenna, slotted and horn antennas, microstrip antennas. Antenna designs for radar applications (Search Radar, Tracking Radar and Imaging Radar)

Unit-IV

Ground Wave Propagation, Basic ideas of ground wave, propagation, reflection at the surface of conducting plane earth ,space and surface waves, tilt of the surface wave, troposphere waves-reflection, refraction, duct propagation.

Unit-V

Ionosphere Propagation: The ionosphere, formation of the various layers, their effective characteristics, reflection and refraction of waves by ionosphere, virtual height, maximum usable frequency(MUF), lowest Usable frequency(LUF), skip distance, regular and irregular variation
of ionosphere, ordinary and extraordinary waves.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the important and fundamental antenna parameters and terminology.
- **CO2.** Explain the working of antennas and formation of antenna patterns for different cases.
- **CO3.** Explain loop, slot, patch and horn antennas. Derive expressions for the parameters of loop and slot antennas.
- **CO4.** Explain ionosphere and troposphere propagation.

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CO5. Develop the basic skills for designing a wide variety of practical antennas and antenna arrays.

Text Books:

1. **Prasad K. D -** Antenna and Wave Propagation, Satya Prakashan.
2. **Jorden F.C. & Balmann B.C**-Electromagnetic waves & radiating System, PHI.

Reference Books:

1. **Kraus J.D,** Antennas, McGraw Hill.
2. **Rao Narayan** - Basic Electromagnetics with application, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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SEMESTER-VI

Course Title: Social Network Analysis	**Max Marks: 100**
Course Code: PEC-ITE-621	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

OBJECTIVE: This course offers the study of highly interconnected and complex world using graphs and revelation of their properties with the tools.

Unit-I

Social Media- Descriptions and Definitions-social media networks-introduction, rise of social media for consumer applications, applying social media to national priorities Social Media Marketing - Theory and Practice, Social Media Marketing (including Viral Marketing), Mobile Marketing

Unit-II

Web Analytics, Social Media Analytics - Criteria of Effectiveness, Metrics, Techniques (e.g., Social Network Analysis, Semantic Analysis, Online Sentiment Analysis), Tools, Social Media Management, Centrality Measures-opinion mining, feature based sentiment analysis,

Unit-III

Community Detection-communities in social media, community detection, taxonomy of community criteria, nodes-centric community detection, complete mutuality: cliques, group-centric community detection, latent space models, spectral clustering, hierarchy-centric community detection. Community evaluation- measuring a clustering result, normalized mutual information, evaluation using semantics,

Unit-IV

Mining Social Network Data, Network Topology Discovery, Link Prediction- definition of link prediction problem, challenges, methods for link prediction-shortest path, neighbourhood based preferential attachment, ensemble of all paths, hitting and commute times,

Unit-V

Link Prediction - Page rank. Comparison of different methods. Managing Big Data, Case Studies-semantic analysis-handling internet slang

COURSE OUTCOMES: After completion of the course student will be able to:

1. Understand working and application of social network platforms
2. Understand Web and Social Media Analytics
3. Identify and detect communities in Social Networks

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4. Create and Discover network topology
5. Understand Link prediction techniques.

TEXT AND REFRENCE BOOKS

1. Networks, Crowds and Markets by David Easley and Jon Kleinberg, Cambridge University Press, 2010.

2. Social and Economic Networks by Matthew O. Jackson, Princeton University Press, 2010.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

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SEMESTER-VI

Course Title: Cloud Computing **Max Marks: 100**
Course Code: PEC-ITE-622 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: This course offers a good understanding of cloud computing concepts andprepares students to be in a position to design cloud based applications.

UNIT-I
Cloud Computing Basics: Cloud Computing Overview, Characteristics, Applications, Internet and Cloud, Benefits, Limitations, Challenges, Cloud Computing Services and Deployment Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

UNIT-II
Cloud Computing vs Other Computing Technologies:
Overview of Grid, Peer-to-Peer, Pervasive and Utility Computing technologies; theircharacteristics and comparison with Cloud Computing.
Accessing the Cloud: Hardware and Infrastructure requirements, Access Mechanisms: WebApplications, Web APIs, Web Browsers.

UNIT-III
Understanding Abstraction and Virtualization
Virtualization Technologies, Load Balancing and Virtualization, Hypervisors, MachineImaging.

UNIT-IV
Scheduling in Cloud
Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling, Optimization techniques for scheduling.

UNIT-V
Cloud Storage and Cloud Standards: Overview, Storage as a Service, Cloud Storage Issues,Challenges, Standards.
Cloud Security: Securing the Cloud, Securing Data, Establishing identity and presence.

COURSE OUTCOMES: After completing the course, students will able to:

1. Develop and deploy cloud application using popular cloud platforms.
2. Design and develop highly scalable cloud-based applications by creating and

3. Configuring virtual machines on the cloud and building private cloud.
4. Explain and identify the techniques of big data analysis in cloud.
5. Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
6. Broadly educate to know the impact of engineering on legal and societal issuesinvolved in addressing the security issues of cloud computing.

TEXT BOOKS:

1. **Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski**, Cloud Computing:Principles and paradigms, 2011
2. **Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter**, Cloud Computing: APractical Approach, McGraw Hill, 2010..

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one questionfrom each unit

SEMESTER-VI

Course Title: Distributed Database System **Max Marks: 100**
Course Code: PEC-ITE-623 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVES:

1. The aim is to impart knowledge to students regarding how distributed database functions and how it is different from traditional file system and centralized database.
2. To provide students knowledge about queries and how queries are handled indistributed database.
3. To provide students knowledge regarding deadlocks in distributed database.

UNIT-I

Distributed Databases- An Overview: Introduction to Distributed Databases, Design issues of Distributed DBMS, Comparison of Distributed and Centralized Systems, DDBMS, Architecture of Distributed DBMS, Global Relations, Fragment and Physical Image, Types ofSchemas, Methods of Fragmentation of a Relation, Levels of Transparency in a Distributed System, Integrity Constraints.

UNIT-II

Query Processing: Objective and problems in Distributed Query Processing, Layers of Query processing, Characteristics of Query Processor, Query Decomposition: Representation of Database Operation in form of a Query, Operation in form of a Query, Operations on a Query, Unary and Binary Tree in a Query, Converting a Global Query into Fragment Query, Join and Union Operations Involving a Query, Aggregate Functions, Parametric Queries, data localization.

UNIT-III

Optimization of Access Strategies: Introduction to Query Optimization, Estimation of Profiles of Algebraic Operations, Optimization Graphs, Reduction of Relation Using Semi- Join and Join Operation, Join ordering in distributed queries, Distributed query optimization Approach.

UNIT-IV

Distributed Transaction Management: Properties and Goals of Transaction Management, Distributed Transactions, Types of Transactions, Recovery Mechanism in case of Transaction Failures, Log Based Recovery, Check Pointing,

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Communication and Site Failures In Case Of a Transaction and Methods to handle them, Serializability and Timestamp in Distributed Databases, Data Replication.

UNIT-V

Concurrency Control & Reliability: Introduction to Distributed Deadlocks, Local and Global Wait for Graphs, Deadlock Detection using Centralized and Hierarchical Controllers,Prevention of Deadlocks, 2 and 3 Phase Locking and Commitment Protocols, Reliability in Commitment and Locking Protocols, Reliability and Concurrency Control, Reliability and Removal of Inconsistency.

COURSE OUTCOME:

At the end of this course, the students will be able to do the following:

1. Differentiate the centralized and distributed database, its architecture. and otherdifferences
2. Get knowledge of Query optimization, query trees and graphs.
3. How relational schema is fragmented for different locations and various methods toretrieve data from distributed location over a network.
4. Understand the various techniques of deadlocks recovery in a distributed database.
5. Understand the various techniques to handle transactions in a distributed database.

TEXT BOOKS:

1. **Ceri Stefano and PelagattiGuiseppe**, Distributed Databases PrinciplesandSystems, McGraw-Hill International Editions.
2. **M. Tamer Ozsu,** Principles of distributed database systems, Third Edition,2011, Springer.

REFERENCE BOOKS:

1. **T. Connolly, Begg&Strachan**,Distributed Database Systems, Addition Wesley.
2. **Trindbery Tim,** Distributed Database System, John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one questionfrom each unit

SEMESTER-VI

Course Title: Advanced Java Programming | **Max Marks: 100**
Course Code: PEC-ITE-624 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: To emphasize on the basic concepts of advanced Java and web based development.

UNIT-I
Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons, Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells, Introduction to GUI Programming with JavaFX: JavaFX Controls and Menus, Comparison among the AWT, Swing, and JavaFX.

UNIT-II
JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data.

UNIT-III
Advance Networking: Client Server Computing, Socket programming, Content and Protocol Handler, TCO & UDP protocol, developing distributed application, RMI, Remote object, Object Serialization.

UNIT-IV
Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and runningservlet, Reading the servlet Parameters, Reading Initialization parameter, Packages- javax.servlet Package, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

UNIT-V
Java Beans: Java Bean, Installing, Starting Bean Development Kit, Use of JAR files and the use of Java Beans API.
JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriplets and Comments), JSP Implicit Object, Object Scope, Synchronization Issue, Session Management, Directive and Custom tag libraries.

COURSE OUTCOMES:

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At the end of this course, the students will be able to do the following:

1. Understanding and designing of GUI
2. Understanding the Java Database connectivity
3. Understanding and designing the distributed and web-based applications
4. Understanding the Server-side and client-side programming
5. Understand JSP and its usages

TEXT BOOKS:

1. **Gary Cornell and Horstmann Cay S.,** Core Java, Vol I and Vol II, SunMicrosystems Press.
2. **Herbert Schildt,** Java: The Complete Reference, McGraw-Hill.Ninth Edition.

REFERENCE BOOKS:

1. **Philip Hanna**, JSP: The Complete Reference, McGraw-Hill.
2. **Deital and Deital**, Java How to Program, Prentice Hall (2007).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions willbe set from each unit. The student has to attempt five questions at least one question from each unit.

SEMESTER-VI

Course Title: Software Testing **Max Marks: 100**
Course Code: PEC-ITE-625 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES: The student should be able to

1. To introduce the basics and necessity of Software testing.
2. To introduce various testing techniques along with software production.
3. To introduce the concepts of Software bugs and its impact.

UNIT-I

INTRODUCTION**:** Definition of software testing ,purpose of testing,basic terminology related to software testing,Phases of software project,Quality, Quality assurance, Quality control, Verification,validation,Life Cycle Models -The V Model,water fall model and Comparison of Various Life Cycle Models

UNIT-II FUNDAMENTALS OF SOFTWARE TESTING :Testing strategies and techniques-structural vs functional testing, static vs dynamics testing,manual vs automated testing. Role of software tester -task of software tester,qualities of a software tester.software testing axioms**.**

UNIT-III TESTING: Level of testing- (Unit testing ,Integration testing,system testing ,Acceptance testing) White Box Testing -(static testing and structural testing),Black Box Testing

UNIT-IV

TEST PLANING: Test planing process, goals, components of test plan,test phases, test strategy,resource requirements, test cases - IEEE 829 standard - to write a test plan ,test procedure/ script

UNIT-V

TEST AUTOMATION: Software test automation ,skill needed for automation ,need for automation testing ,test tools, benefits of automation testing - challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

COURSE OUTCOMES:

At the end of the course the students will be able to

1. Understand the various models.
2. Understand the various testing strategies
3. Understand the testing levels.
4. Prepare test planning based on the document.
5. Develop and validate a test plan, use of automatic testing tools.

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TEXTBOOKS:

1. GlenfordJ.Myers, Tom Badgett, Corey Sandler, "The Art of Software Testing",3rd edition, John Wiley & Sons publication, 2012.
2. SrinivasanDesikan, Gopalaswamy Ramesh, "Software testing- Principles and Practices", Pearson education, 2009.

REFERENCE BOOKS:

1. Ron Patton, "Software testing", second edition, Pearson education, 2009.
2. BorisBeizer, "Software testing techniques", Dream Tech Press, 2009.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one questionfrom each unit

SEMESTER-VI

Course Title: Data Mining & Warehousing | **Max Marks: 100**
Course Code: PEC-ITE-626 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply pre-processing methods on raw data.
3. Learning different classification algorithms for data mining.

Unit-I

Introduction: Sources, Users, Applications and Goals of a Data Warehouse,Functions of Data Warehouse, Components of a DataWarehouse, Operational Data Store, Dimensional Modeling: Fact and Dimension Tables, Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions,Helper Table

Unit-II

Data Warehouse: Characteristics of a Data Warehouse, Software Architecture and Design, Data Granularity Model, Data Warehouse Bus Architecture. Meta Data: Need and Types of Metadata, Metadata Process Concept. Data Marts and its Characteristics, Comparison between OLTP and OLAP.

Unit-III

Decision Support System (DSS): Using Data Warehouse for DSS, Techniques and Solutions for constructing a Central Data Warehouse, Data Extraction, Cleanup, and Transformation Tools, Managing a Data Warehouse Environment.

Unit-IV

Data Mining: Introduction to Data Mining and Uses, Data Mining Functionalities, Classification of Data Mining systems, Data Mining task Primitives.
Association Rules: Association rules mining, Mining Association rules from single level, multilevel transaction databases, multidimensional relational databases and data warehouses, Co-relational analysis, Constraint based association mining.

Unit-V

Classification and Clustering: Classification and prediction, decision tree induction, Bayesian classification, k-nearest neighbor classification, rule based classification, classification of back propagation, support vector machines, associative classification, cluster analysis, types of data in clustering, categorization of clustering methods, genetic algorithms and data visualization concepts.

Course Outcomes :

1. Students who complete this course should be able to

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2. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
3. Describe the various architectures and main components of a data warehouse.
4. Design a data warehouse, and be able to address issues that arise when implementation data warehouse.
5. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
6. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. Gray & Smith, Data Warehousing handbook, CRS, PHI
2. Berson, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. Mallach, Data Warehousing System, McGraw Hill.
2. Prabhu, Data Warehousing–Concepts, Techniques, Products and Applications, 2nd Edn, PHI.

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SEMESTER VII

Course Title: Blockchain Technologies | **Max Marks: 100**
Course Code: PCC-ITE-721 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: The objective of the course is to introduce the concept of Blockchain Architecture (public, private, consortium) which enables them to work with different blockchain technologies.

Unit-I
Cryptography: Traditional and Modern Cryptography techniques. Symmetric key cryptography, Asymmetric key cryptography (ECC and RSA), Signatures, hash.

Unit-II
Blockchain definition, shortcomings of current transaction systems, distributed network, difference between blockchain and traditional database, evaluation of blockchain. Core Components of Blockchain Architecture, Bitcoin's block structure, node, Merkle Trees, Shared ledger, Mining, validators.

Unit-III
Consensus and cryptography behind the blockchain: Bitcoin Blockchain transaction flow. Blockchain need, use cases of blockchain, Types of Blockchain Architecture (public, private, consortium). How consensus works? Consensus in Bitcoin – I (The Basics, PoW and Beyond, The Miners), Permissioned Blockchain, proof of stake, delegated proof of stake, round robin, PBFT, POET.

Unit-IV
Ethereum: Public consortium blockchain: Introduction of Ethereum, Ethereum account, Ethereum network, Ethereum client, Ethereum gas, Ethereum virtual machine, Ethereum block, header, Ether. Solidity language: Writing smart contracts: Ethereum development: Preparing smart contract, development tools: remix, geth and mist etc., token standard.

Unit-V
Hyperledger: Private consortium: Hyperledger Burrow, Hyperledger Sawtooth, Hyperledger fabric, Hyperledger indy, Hyperledger iroha. Hyperledger suitability according to project. Tools in Hyperledger: Caliper, composer, explorer.

Course Outcomes: At the end of this course, the students will able to do the following:
1. Understand the basic concept of modern and traditional cryptography techniques.
2. Comprehend the concept of Blockchain Architecture (public, private, consortium).
3. Demonstrate the Ethereum, Ethereum network, and Bitcoin's block structure.
4. Development of smart contracts: Ethereum development.
5. Demonstrate Hyperledger fabric and Hyperledger suitability for project development

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Text Books:

1. Blockchain by Melanie Swa, O'Reilly, 1 edition (2015).
2. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos, O'Reilly, 1 edition (December 20, 2014).

Reference Books

1. Blockchain quick reference, by Brenn Hill, Packt Publishing; 1 edition (August 10,2018),

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SEMESTER VII

Course Title: Entrepreneurship Development & Management **Max Marks: 100**
Course Code: HSMC-ITE- 721 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, Objectives, Functions and Type of Entrepreneurs, Importance of Entrepreneurship Training, Factors affecting Entrepreneurship in India, Linkage between Entrepreneurship and Economic Development, Problem of Increasing Unemployment, Balanced Regional Growth, Harnessing Locally Available Resources, New Industrial Policy and Innovation in Enterprises.Case Study of Successful Entrepreneurs.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centers and other Supporting Agencies.

Unit-III

Project Report Preparation: Identifying Business Opportunities (SWOT Analysis), Project Report and its Importance, Various Contents of Project Report: Managerial and Entrepreneurial Capabilities, Socio-Economic Benefits, Demand Analysis, Technical Feasibility and Financial Viability.

Unit-IV

Introduction to Marketing Management: Brief Introduction to various types of Product Strategies, Pricing Strategies, Channel Strategies and Promotional Strategies. Introduction to Production Management: Types of Production Systems, Production Planning and Control, Functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, Selection, Placement and Induction, Training and Development, Compensation.
Introduction to Financial Management: Source of Finance and Working Capital Management.

Course Outcomes:

At the end of this course, the students will able to do following:

1.Have the ability to discern distinct entrepreneurial traits

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2.Understand the systematic process to select and screen a business idea
3.Understanding the market strategy and constraints for new business ideas
4.Design strategies for successful implementation of ideas
5.Write a successful business plan

Text Books:

1.Holt David H, Entrepreneurship: New Venture Creation, PHI (4000).

2.Saini Jasmer Singh, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).

Reference Books:

1.Dollinger, Entrepreneurship Strategies and Resources, Pearson Education (4003).

2.Jose Paul & Kumar Ajith N, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).

3.Hisrich Robert D and Micheal Peters P, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER-VII

Course Title: Application Development Using Android Lab. **Max Marks: 50**
Course Code: PCC-ITE-731 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

OBJECTIVE:
The lab course is designed to help the students in using the development tools in the android development environment. The students will learn the basics of Android platform and get to understand the application life cycle.

LIST OF EXPERIMENTS:

1. Introduction to Android Operating System
2. Program for First Android Application.
3. Program for building a simple user interface using an XML for UI layout.
4. Program for developing an Android Application using a linear layout.
5. Program for developing an Android Application using a Relative layout.
6. Program for developing an Android Application using a Table layout.
7. Program for developing an Android Application using an absolute layout.
8. Program for developing an Android Application using a Frame layout.
9. Developing an android application using Relative layout to display Date and time.

COURSE OUTCOMES:

1.To develop a deeper understanding of working of Android Operating System.
2.To develop understanding of installing Android Studio in order to create professional android apps.
3.To develop understanding of XML and Java in creating many real working apps that work properly, look great, and are up to date.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

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SEMESTER-VII

Course Title: Blockchain Technologies Lab | **Max Marks: 50**
Course Code: PCC-ITE-732 | **University Examination: 25**
Duration of Exam: 2 hours | **Internal Assessment: 25**

OBJECTIVE:
The lab course is designed to help the students in using the blockchain technologies. The students will learn the basics of Ethereum and Hyperledger to develop simple applications using blockchain.

LIST OF EXPERIMENTS:

1. Create a Simple Blockchain in any suitable programming language.
2. Use Geth to Implement Private Ethereum Block Chain.
3. Build Hyperledger Fabric Client Application.
4. Build Hyperledger Fabric with Smart Contract.
5. Using Python Libraries to develop Block Chain Application.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

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SEMESTER-VII

Course Title: Environmental Engineering | **Max Marks: 100**
Course Code: OEC-ITE-721/PCC-CE-522 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: This course aims to make students understand the various aspects of environment and to understand the impact of humans on environment.

UNIT -I

Water quality and treatment: Water demand Residential, Commercial, Institutional, industrial and agricultural, Forecasting of water demand, Sources of Water, water quality parameters, Water quality standards, Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes, Water Supply systems, Components of water supply system, Distribution system, Plumbing and various valves used in water supply systems.

UNIT II

Sewage Characteristics and treatment: Quantity of Sewage, Sewage flow variations, Characteristics and composition of sewage, Pollution due to improper disposal of sewage, Sewerage system and its components, Design of Sewerage system primary, secondary and tertiary treatment of sewage- description of various unit operation and processes, aerobic and anaerobic treatment systems, suspended and attached growth systems, quality requirements (Regulatory standards) for various usages.

UNIT III

Air Pollution and control: Definition of Air pollution, major pollutants- sources and impacts, Air Quality standards, Air pollution meteorology, Plum rise and plum behaviour, Introduction to air quality models and their applications, Monitoring of air pollutants, Control measures.

UNIT IV

Solid waste management- Solid waste, Municipal, industrial and hazardous solid waste, Characteristics and Composition of solid waste, Impact of improper disposal of solid waste, solid waste management, Elements of solid waste management system- generation, collection, transfer and transport, segregation, recycling, reuse, disposal, composting, vermin composting and landfills

UNIT V

Noise pollution and control: Noise pollution, sources (Indoor and outdoor) and impacts, Permissible limits, measurement of noise, Addition of Noise, Noise propagation, control of noise pollution- at source.

Course Outcomes: After successfully studying this course, students will:

1. Understand the impact of humans on environment and environment on humans
2. Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.

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3. Be able to plan strategies to control, reduce and monitor pollution.
4. Be able to select the most appropriate technique for the treatment of water, waste water solid waste and contaminated air.
5. Be conversant with basic environmental legislation.

Text books:

1. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg S.K: Water Supply Engineering (Environmental Engineering Vol.–I) 4. Garg S.K: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Reference Books:

1. Modi, P. N;Water supply Engineering. Volume-I
2. Introduction to Environmental Engineering and Science by Gilbert Masters, PrenticeHall, New Jersey.
3. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan,Thompson /Brooks/Cole.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

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SEMESTER-VII

Course Title: Communication System | **Max Marks: 100**
Course Code: OEC-ITE-722/ PCC-ECE-522 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: The objective of this course is to provide students with a working knowledge of the basic principles underlying the Communication Systems.

Unit-I
Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling of analog signals, Quantization, Quantization error, signal to noise ratio due to Quantization, PCM Coding, Companding in PCM systems. Differential PCM systems (DPCM). BW of PCM. Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM DM systems and DPCM.

Unit-II
Line Coding Schemes: Basic definition, requirements of line coding schemes, different line coding techniques like NRZ (unipolar and bipolar), RZ, Manchester, Alternate mark and Inversion, HDBn, B8ZS, 4B/5B etc. coding schemes. Their properties and advantages.

Unit-III
Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, QAM, similarity of BFSK and BPSK, Constellation Diagram.

Unit-IV
Performance of Digital Communication Systems: Concept of noise, Various Noise types ,Additive white Gaussian noise, Bandlimited AWGN, probability of error coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

Unit-V
Spread Spectrum Modulation: Basic definitions of spread spectrum, advantages, Signal space Dimensionality and processing gain-Probability of error, Frequency hop spread spectrum - pseudo-noise sequences – Direct sequence spread spectrum with coherent binary phase shift keying – problem in spread spectrum systems.

Course Outcomes:
After completion of the course student will be able to:
CO1. Understand different pulse digital modulations and their advantages, disadvantages.
CO2. Understand different line coding techniques and their properties.

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CO3. Differentiate between various digital modulation techniques and their advantages & disadvantages.
CO4. Know about white Gaussian noise, mathematical modelling for different types of filters used to reduce noises in communication system.
CO5. Understand different spread spectrum techniques.

Text Books:

1. Simon Haykin, Digital communications, John Wiley, 2005
2. H. Taub and D. Schilling, Principles of Communication Systems, TMH, 2003

Reference Books:

1. Sam Shanmugam, Digital and Analog Communication Systems, John Wiley, 2005
2. John Proakis, Digital Communications TMH, 1983
3. Singh & Sapre, Communication Systems Analog & Digital TMH, 2004
4. B.P. Lathi, Modern Analog & Digital Communication Oxford reprint,

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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SEMESTER-VII

Course Title: Optical Communication | **Max Marks: 100**
Course Code: OEC-ITE-723/PEC-ECE-727 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles of Optical Communication to the students. Applied and Industrial Aspects of optical communication have been taken care of in an appropriate manner.

Unit–I

Overview of Optical Fiber Communication: Brief Overview of Optical Communication, Basic concepts, light wave components, principle of light transmission, channel capacity etc. Nature of light, polarization, basic laws and definition, mode theory analysis for optical communication, optical fiber modes and configuration, wave propagation in optical fiber, operating wavelength, single mode and multimode fibers, V–numbers, mode field diameter, numerical aperture, refractive index profiles.

Unit–II

Signal Degradation in Optical Fibers: Attenuation, absorption, scattering losses, bending losses in optical fibers. Dispersion in optical waveguides, group delay, material dispersion, waveguide dispersion, intermodal dispersion and chromatic dispersion in single mode fibers, Non linearities in Fibers

Unit–III

Optical Sources: Basic concepts from semiconductor electronics, energy bands, Concept of Direct and indirect Band Devices. Light emitting diodes: Structure, principle, material, modulation response, transient response. Laser diodes: Principle of action, structure, efficiency and characteristics of laser diodes, modulation He–Ne lasers, DFB lasers.

Unit-IV

Optical Detectors: Basic Information in light detectors, Role of an optical detector, Detector Characteristics: Responsivity, Noise Equivalent Power, Detectivity, Quantum efficiency, Detector response time, Linearity, Spectral response, Noise Considerations, The PN junction photo diode – PIN photodetectors – Avalanche photo diode construction characteristics and properties, APD Specifications, simple model of photo receiver – its equivalent for SNR, Optical Receivers.

Unit–V

Transmission Systems and Advanced Multiplexing Strategies: Power Launching and coupling. Point to point link system consideration, Optical TDM, subscriber multiplexing (SCM), WDM and Hybrid multiplexing methods, Optical amplifiers – EDFA

Course Outcomes:

After completion of the course student will be able to:

CO1. To recognize and classify the structures of Optical fiber systems and their types.

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CO2. To understand the channel impediments like losses, interference and dispersion.

CO3. To understand the Optical sources and detectors and thus able to illustrate their working principle.

CO4. To familiarise with Design considerations of fiber optic systems.

CO5. To understand the transmission consideration and multiplexing strategies

Text Books:

1. **John M Senior -**Optical Comm Techniques –PHI
2. **Keiser G-** Optical Fiber Communication, 3rd Edition, Mc Graw Hill International

Reference Books:

1. **Ghatak & Thyangarajan K**- Introduction to fiber optics, Cambridge university press,1998.
2. **Mynbacv D.F. and Scheine L -**Fiber Optic Communication Technique, Pearson.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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SEMESTER-VII

Course Title: Software Project Management **Max Marks: 100**
Course Code: PEC-ITE-721 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: The objective of the subject is to impart an understand of software project management.

UNIT-I

INTRODUCTION AND SOFTWARE PROJECT PLANNING**:** Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

UNIT-II

PROJECT ORGANIZATION AND SCHEDULING**:** Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT-III

PROJECT MONITORING AND CONTROL: Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Desk- checks, Walkthroughs, Code Reviews, Pair Programming.

UNIT-IV

SOFTWARE QUALITY ASSURANCE AND TESTING**:** Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics

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and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Clean-room process.

UNIT-V

PROJECT MANAGEMENT AND PROJECT MANAGEMENT TOOLS: Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

COURSE OUTCOMES:

1. To have an understanding of how Software Project Management is done.
2. How to Build the project schedules.
3. Understand how budgeting is done.
4. How to assure quality in a software through testing.
5. To have understanding of Planning and Scheduling Tools.

TEXT BOOKS\ REFERENCE BOOKS:

1. **M. Cotterell,** Software Project Management, Tata McGraw-Hill Publication.
2. **Royce,** Software Project Management, Pearson Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

SEMESTER-VII

Course Title: Computer Based Numerical Techniques **Max Marks: 100**
Course Code: PEC-ITE-722 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVE: The objective of this course is to introduce students to the various numerical techniques which find their applications in almost every sphere of Science and Engineering.

UNIT-I
Introduction: Errors and Significant Digits. Algebraic Equations: Bisection Method, Secant Method, Newton Raphson Method, Graeffe's Root Squaring Method, Regula-Falsi Method.

UNIT-II
Solution for Systems of Equations: Gauss Elimination, Gauss Jordan and Partition Method for Linear System of Equations.

UNIT-III
Interpolation: Introduction. Forward, Backward, Central and Divided Differences, Newton`s Formula for Equal and Unequal Intervals. Lagrange`s Interpolation Formula.Sterling`s and Bessel`s Formula.

UNIT-IV
Numerical Integration and Differentiation: Introduction. Trapezoidal Rule,Simpson`s 1/3 Rule, Simpson`s 3/8 Rule. Gaussian Integration.

UNIT-V
Difference Equations and their Solutions: Numerical Methods, Taylor Series Methods, Euler`s Method, Range Kutta Method, Predictor Corrector Method, Adams Bashforth Method.

COURSE OUTCOMES:
At the end of this course, the students will able to do the following:

1. Understand Various Numerical Techniques and their applications.
2. Implement various numerical solution algorithms using c programming.
3. Be familiar with calculations and interpretation of errors in numerical method.
4. To learn various integration and differentiation formulas in the field of

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computer science and engineering.

5. Understanding the implications of approximations.

TEXT BOOKS:

1. **Balagurusamy**, Numerical Methods, TMH.
2. **V. Rajaraman,** Introduction to Numerical Methods, TMH.

REFERENCE BOOKS:

1. **Schilling**, Applied Numerical Methods for Engineers using MATLAB and C, Cengage India.
2. **Cheney**, Numerical Mathematics & Computing, Cengage India.

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SEMESTER-VII

Course Title: Bio-Metrics and Network Security | **Max Marks: 100**
Course Code: PEC-ITE-723 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: To understand the principles of biometric systems.

UNIT I

INTRODUCTION- Biometric Fundamentals-Biometric technologies – Biometrics Vs traditional techniques – Characteristics of a good biometric system – Benefits of biometrics – Key biometric processes: verification, identification and biometric matching – Performance measures in biometric systems: FAR, FRR, FTE rate, EER and ATV rate. Introduction of biometric traits and its aim.

UNIT II

PHYSIOLOGICAL BIOMETRICS - Leading technologies: Finger-scan – Facial-scan – Iris-scan – Voice-scan – Hand Scan, Retina Scan - components, working principles, competing technologies, strengths and weaknesses. Selection of suitable biometric. Biometric attributes, zephyr charts, types of multi biometrics. Verifications on multimodal system, normalization strategy, fusion methods, multimodal identification.

UNIT III

AUTOMATED BIOMETRIC SYSTEM AND BEHAVIORAL BIOMETRICS **-** Automated fingerprint identification systems - Leading technologies: Signature-scan – Keystroke scan – components, working principles, strengths and weaknesses.

UNIT IV

BIOMETRIC SYSTEM SECURITY: Biometric system vulnerabilities, circumvention, covert acquisition, quality control, template generation, interoperability data storage. Recognition systems: face, signature, fingerprint, ear, iris, Palm etc.

UNIT V

PRIVACY AND STANDARDS IN BIOMETRICS- Assessing the Privacy Risks of Biometrics – Designing Privacy-Sympathetic Biometric Systems – Need for standards – different biometric standards.

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COURSE OBJECTIVES:

1. To have an understanding of biometric traits
2. To have an understanding of various biometric traits.
3. To have an understanding of automated biometric systems.
4. To have an understanding about how to secure a biometric systems.
5. Understand privacy concerns and how to address them.

TEXTBOOKS:

1. **SamirNanavati, Michael Thieme, Raj Nanavati,** "Biometrics – Identity Verification in a
2. **Wiley-dreamtech,** Networked World, India Pvt Ltd, New Delhi, 2003

REFERENCE BOOKS:

1. **John R Vacca,** "Biometric Technologies and Verification Systems", Elsevier Inc, 2007
2. **Anil K Jain, Patrick Flynn, Arun A Ross**, "Handbook of Biometrics", Springer, 2008

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

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SEMESTER-VII

Course Title: Artificial Intelligence | **Max Marks: 100**
Course Code: PEC-ITE-724 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The student should be made to Learn the various Artificial intelligence frame work, Knowledge representation, problem solving, natural language.

UNIT I

Introduction to Artificial Intelligence: Problem Solving Concepts. Definition of Pattern Recognition. Production System. Problem and Production. System Characteristics. Two Path Problem. Analysis of Artificial Intelligence Techniques. Criteria and Success.

UNIT II

Knowledge Representation Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning, Scripts. Production Systems.

UNIT III

Problem Solving Algorithms: State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT IV

Understanding Natural Languages: Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

UNIT V

Expert System: Need and justification for expert systems, knowledge acquisition

Learning: Concept of learning, learning automation, genetic algorithm, learning types..

Programming Language: Introduction to programming Language PROLOG.

Course outcome:

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1. Understand basics of artificial intelligence
2. knowledge representation
3. Understanding problem solving techniques
4. Understand natural languages.
5. Understanding Expert system and learning methods

Text Books:

1.E. Rich and K. Knight, “Artificial intelligence”, TMH, 2nd ed., 1992.
2. N.J. Nilsson, “Principles of AI”, Narosa Publ. House, 1990.
3.John J. Craig, “Introduction to Robotics”, Addison Wesley publication
4. Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, “Robotic Engineering – An integrated approach”, PHI Publication

References Books:

1.D.W. Patterson, “Introduction to AI and Expert Systems”, PHI, 1992.
2.Peter Jackson, “Introduction to Expert Systems”, AWP, M.A., 1992.
3. R.J. Schalkoff, “Artificial Intelligence - an Engineering Approach”, McGraw Hill Int. Ed., Singapore, 1992.
4. M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

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SEMESTER-VII

Course Title: Linux Administration **Max Marks: 100**
Course Code: PEC-ITE-725 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVE: The objective of the subject is to introduce students to Linux administrations

UNIT-I
INTRODUCTION: Duties of the Administrator, Administration tools, Overview of permissions. Processes: Process status, Killing processes, process priority. Starting up and Shut down: Peripherals, Kernel loading, Console, The scheduler, init and the inittab file, Run-levels, Run level scripts. Managing User Accounts: Principles, password file, Password security, Shadow file, Groups and the group file, Shells, restricted shells, user management commands, homes and permissions, default files, profiles, locking accounts, setting passwords, Switching user, Switching group, Removing users.

UNIT-II
MANAGING UNIX FILE SYSTEMS: Partitions, Swap space, Device files, Raw and Block files, Formatting disks, Makingfiles ystems, Superblock, I-nodes, Filesystem checker, Mounting filesystems, Logical Volumes, Network File systems, Boot disks.
CONFIGURING THE TCP/IP Networking : Kernel Configuration; Mounting the /procFilesystem, Installing the Binaries, Setting the Hostname, Assigning IP Addresses, Creating Subnets, Writing hosts and networks Files, Interface Configuration for IP, ifconfig, netstat command, Checking the ARP Tables; Name service and resolver configuration.

UNIT-III
TCP/IP FIREWALL : Methods of Attack, What Is a Firewall? What Is IP Filtering? Setting Up Linux for Firewalling Testing a Firewall Configuration; A Sample Firewall Configuration: IP Accounting, Configuring the Kernel for IP Accounting, Configuring IP Accounting, Using IP Accounting Results

UNIT-IV
IP MASQUERADE AND NETWORK ADDRESS TRANSLATION: Side Effects and Fringe Benefits, Configuring the Kernel for IP Masquerade, Configuring IP Masquerade. The Network Information System: Getting Acquainted with NIS, NIS Versus NIS+ , The Client Side of NIS, Running an NIS Server, NIS Server Security

UNIT-V
NETWORK FILE SYSTEM: Preparing NFS, Mounting an NFS Volume, The NFS Daemons, The exports File.System Backup & Recovery: Log files for system and applications; Backup

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COURSE OUTCOMES: At the end of course students are expected to

1. Install, configure and manage enterprise systems/neworks, including hardware/software.
2. Improve Linux thinking skills
3. Have an understanding of Linux basics.
4. Have an understanding of administrator duties and role.
5. Maintain and troubleshoot enterprise networks.
6. Able to deploy Linux for commercial environmental need in industry

TEXTBOOKS:

1. **Palmer:** Hands-On Networking Fundamentals| | Edition: 2nd | Copyright Year: 2013 ISBN: 9781111306748
2. **Boyle**, Applied Networking Labs: A Hands-On Guide to Networking and Server Management | | Edition: 1st | Copyright Year: 2011 | ISBN: 9780132310345

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

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SEMESTER-VIII

Course Title: Real Time Operating System | **Max Marks: 100**
Course Code: PEC-ITE-821 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: The aim of the subject is to provide basic and necessary information about the working of RTOS and Embedded Systems.

UNIT-I
Introduction to RTOS and Embedded System
Brief History of Operating system, Introduction to real time operating system, Introduction to Embedded Systems, Definition of RTOS, Characteristics and Features Real Time Kernels, Scheduler, Objects, Services

UNIT-II:
Tasks & Memory Management
Tasks and memory management: Introduction, Defining Tasks, Task state and scheduling, Task operation, Task structures, Synchronization, communication and concurrency. Memory management concepts in RTOS

UNIT-III:
IPC Mechanism
Defining Semaphore, Semaphore operation, use of semaphore. Defining Message queues, Message queue states, Message queue contents, use Pipes, Signals, and Condition variables.

UNIT-IV
Exceptions & Interrupts
Defining exceptions and interrupts. How they are implemented. Applications of exceptions and interrupts, Types of interrupts, Handling interrupts

UNIT-V
Timer & Timer Services
Real Time clocks and system clocks, Programmable interval timers, Timer interrupt, Service routines. Basic I/O concepts, The I/O Subsystem.

COURSE OUTCOMES:
At the end of this course, the students will able to do the following:

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1. Understand the basic concept of RTOS and its usefulness for embedded systems
2. Understand Theoretical background and practical knowledge of real-time operating systems.
3. Understand multitasking techniques in real-time systems.
4. Understand the impact of real time operating systems on application area.
5. Understanding Several Timing services

TEXT BOOKS:

1. **Qing Li**, Real Time concepts in Embedded Systems, CMP Publications.
2. **V. Penumchu,** Simple RTOS, Trafford Publications.

REFERNCE BOOKS:

1. **Mall Rajib**, Real Time Systems: Theory & Practice.
2. **C.M. Krishna,Kang,G.Shin**, Real Time Systems',TataMcgrawhill 1997

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SEMESTER-VIII

Course Title: Big Data Analytics | **Max Marks: 100**
Course Code: PEC-ITE-822 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

COURSE OBJECTIVE: This course provides practical foundation level training and grounding in basic and advanced methods to big data technology and tools, including Map Reduce and Hadoop and its ecosystem.

UNIT-I

Big Data: Introduction, Characteristics, 5Vs, Sources of Big Data, Big Data technology and trends, Big Data Applications, Big Data Tools, Map Reduce Concept, Hadoop Introduction, Traditional Software Vs Hadoop, Distributed File System.

UNIT-II

Hadoop Architecture: Introduction, Hadoop Storage- HDFS, Block Size, Replication, Common Hadoop Shell Commands, Hadoop versions. Hadoop Components:-Namenode, Secondary Namenode, Node Manager, YarnResource Scheduler, Map Reduce Paradigm, Hadoop Programming. Cluster Setup:- SSH, Hadoop Configurations, Administration.

UNIT-III

Hadoop Ecosystem: Big data pipeline, Difference between ETL & Big Data Streaming, Introduction to Hive, Hive Architecture & its installation, Hive Vs RDBMS, Kafka, Flume, Pig, Sqoop, Flume, Zookeeper, MapR, Cloudera, HadoopVs Spark, Introduction to Scala Programming.

UNIT-IV

Data Analytics with R: Supervised Vs Unsupervised Learning, Clustering, Regression and Classification, Data Visualization (ggplot2 package), Rhadoop, Text Mining with R, Data Analytics Case Study.

UNIT-V

Data Visualization, Business Intelligence (BI), Tools of BI, Functional and Technical Value of BI, Architecture of BI, Data Lake and BI, Introduction to Python Programming and its Libraries, Visualization using Python and Matlab.

COURSE OUTCOMES:

After completing this course, the student should be able to:

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1. Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data
2. Gain hands-on experience on large-scale analytics tools
3. Understand and study Hadoop ecosystem
4. Study R for text mining and to analyze data
5. Understand data visualization and to study python programming

TEXT BOOKS:

1. **Tom White**, "HADOOP: The definitive Guide" , O Reilly 2012.
2. **VigneshPrajapati**, "Big Data Analytics with R and Haoop", Packet Publishing 2013.

REFERNCE BOOKS:

1. **Borislublinsky, Kevin t. Smith, Alexey Yakubovich,** "ProfessionalHadoop Solutions",Wiley, 2015.
2. **Chris Eaton, Dirk deroos et al**., "Understanding Big data ", McGraw Hill, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER-VIII

Course Title: Distributed Systems | **Max Marks: 100**
Course Code: PEC-ITE-823 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: The objective of this course is to introduce students to the fundamentals and techniques of distributed computing. Students are expected to develop distributed applications using latest technologies.

UNIT-I

INTRODUCTION: Introduction to Distributed System; Goals, Hardware Concepts, Software Concepts and Client-Server Model. Examples of Distributed Systems.

UNIT-II

PROCESS AND INTER PROCESS COMMUNICATION: Communication: Layered Protocols, Remote Procedures Call, Remote Object Invocation, Message-Oriented Communication. Processes: Threads, Code Migration, Software Agent.

UNIT-III

NAMING & SYNCHRONIZATION: Naming: Naming Entities, Locating Mobile Entities, Removing Un-Referenced Entities. Synchronization: Election Algorithms, Mutual Exclusion, Distributed Transactions.

UNIT-IV

CONSISTENCY AND REPLICATION: Consistency and Replication: Introduction, Data Centric Consistency Models, Client Centric Consistency Models, Distribution Protocols.

Fault Tolerance; Introduction, Process Resilience, Reliable Group Communication. Distributed Commit.

UNIT-V

SECURITY POLICIES: Security: Introduction, Secure Channels, Access Control, Security Management.

COURSE OUTCOMES:

1. Study software components of distributed computing systems.

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2. Know about the communication and interconnection architecture of multiple computer systems.
3. Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
4. Understanding of networks & protocols, mobile & wireless computing and their applications to real world problems.
5. To be familiar with the design, implementation and security issues of distributed system.

TEXT BOOKS:

1. **Tannenbaum A. S**., "Distributed Systems: Principles and Paradigms", PHI.
2. **G. Coulouris, J. Dollimore, and T. Kindberg,** Distributed Systems: Concepts and Design, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

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SEMESTER-VIII

Course Title: Wireless Networks	**Max Marks: 100**
Course Code: PEC-ITE-824	**University Examination: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

COURSE OBJECTIVE: The aim of the subject is to acquaint the students about the present scenarios of various wireless networks

UNIT-I
Introduction to Wireless Networks: Wired vs Wireless Communication, Present scenario of Wireless Networks, Comparative analysis of Different Generations of Networks, Operation of Cellular Wireless Networks

UNIT-II
Wireless LANS: Infrared LANS, spread spectrum LANS, narrowband microwave LANS, IEEE 802.11 wireless LAN standard, Mobile IP

UNIT-III
Satellite communications: Brief History, Applications, satellite parameters & configurations- GEO, LEO, MEO, Capacity allocation (frequency division, time division.

UNIT-IV
Ad Hoc wireless Networks: Introduction to Ad Hoc networks, Difference between Infrastructure based and Ad-Hoc wireless networks, applications, challenges and issues, measures to improve the quality of service (QoS) in Ad hoc networks

UNIT-V
Optical Wireless Networks (OWC): Introduction, Indoor and outdoor optical wireless networks, optical wireless communications vs Radio Frequency (RF) wireless Communication, Applications of optical wireless Networks, atmospheric effect on OWC

COURSE OUTCOMES: On successful completion of this unit students will be able to:
1.Understand the present scenario of wireless networks

2.Identify the basic concept of wireless networks along with its types

3.Compare LEO, MEO and GEO satellite communication

4.Get an insight into Ad hoc networks

5.Understand the need and potential of optical wireless network

TEXT BOOKS:

1. **Stallings William**, Wireless Communications & Networking, PHI.

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2. **PahlavanKaven,** Principles of Wireless Networks,, Pearson Education India.

REFERNCE BOOKS:

1. **Nicopolitidis, H. S. Obaidat**, Wireless Networks, John Wiley.
2. **Stoimenovic Ivan**, Handbook of Wireless Networks & Mobile Computing, CRS Presss.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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SEMESTER-VIII

Course Title: Deep Learning | **Max Marks: 100**
Course Code: PEC-ITE-825 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: This course will explore applications and theory relevant to problem solving using deep learning. By the end of this course, students will gain intuition about how to apply various techniques judiciously and how to evaluate success. Students will also gain deeper insight into why certain techniques may work or fail for certain kinds of problems.

UNIT-I

MACHINE LEARNING BASICS: Learning Algorithms, Capacity, Overfitting and Underfitting, Hyperparameters and Validation Sets, Estimators, Bias and Variance. Maximum Likelihood Estimation. Bayesian Statistics. Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Descent.Building a Machine Learning Algorithm.Challenges Motivating Deep Learning.

UNIT-II

INTRODUCTION TO DEEP LEARNING: Neural Network Basics, feedback and Feed forward Neural networks, Shallow Neural Network, Deep Neural Networks Convolution Neural Networks, Gradient descent and the back propagation algorithm. Unit saturation, vanishing gradient problem, and ways to mitigate it.RelU Heuristics for avoiding bad local minima.Heuristics for faster training.Nestors accelerated gradient descent. Regularization. Dropout.

UNIT-III

CONVOLUTIONAL NEURAL NETWORKS: Architectures, convolution / pooling layers, Recurrent Neural Networks LSTM, GRU, Encoder Decoder architectures.

UNIT-IV

DEEP UNSUPERVISED LEARNING: Autoencoders (standard, sparse, denoising, contractive, etc), Variational Autoen coders, Adversarial Generative Networks, Autoencoder and DBM Attention and memory models, Dynamic memory networks

UNIT-V

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APPLICATIONS: application of deep learning to computer vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models. Attention models for computer vision tasks.

COURSE OUTCOMES: Upon successful completion of the course, students should be able to:

1. Understand key concepts related to Deep Learning.
2. Derive a simple Feedforward Neural Network (DNN).
3. Understand DNN architecture and parameters.
4. Intuitively understand theory on why DNN works.
5. Be able to compare DNN to other Machine Learning techniques
6. Apply DNN to real-life problems.

TEXT\REFERENCE BOOKS:

1. **Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville.** "Deep learning." AnMIT Press book in preparation. (2015).
2. **Bengio, Yoshua**. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009): 1127.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

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SEMESTER-VIII

Course Title: Security and Privacy | **Max Marks: 100**
Course Code: PEC-ITE-826 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

OBJECTIVE: This course will explore security and privacy issues in the digital world.

Unit I
Introduction to security and privacy, Number theory, Formal analysis and design of algorithms and protocols, Provably security, Cryptosystems.

Unit II
Privacy, Foundations of privacy, Differential privacy, Definitions and early uses, Privacy regulations, Noiseless differential privacy, Privacy preserving, Data mining techniques.

Unit III
Measuring compliance with security and privacy regulations and standards, Security and Privacy Metrics.

Unit IV
Physical security, IT security, Personal Security, Operational security.

Unit V
Security and privacy in social networks, Measurement of user behavior in social networks, An effective user user-driven framework for selection of social networks, Providing group anonymity in social networks.

COURSE OUTCOMES: Upon successful completion of the course, students should be able to:

1. Understand key concepts related to Security and Privacy.
2. Understand Privacy preserving techniques.
3. Understand privacy regulations and standards.
4. Intuitively understand Physical security and IT security.
5. Issues of security and privacy in social networks.

Text Books:
1. J. Thomas Shaw, "*Information Security Privacy*", ABA, 2012.
2. Matthew Bailey, "*Complete Guide to Internet Privacy, Anonymity and Security*", Nerel Online, 2011.

Reference Books:

Dr. Manmeet Singh, Coordinator | Malik Mubasher Hassan, (A.P., ITE) | Nikhil Gupta, (A.P., ITE) | Rakesh Singh Sambyal, (A.P., ITE) | Prof. Asif Husain, Dean, SoET

1. D. S. Herrmann, "*A complete guide to security and privacy metrics*", Auerbach Publisher (Taylor and Francis Group), 2007
2. A. Abraham, "*Computational Social Networks: security and privacy*", Springer, 2012

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Dr. Manmeet Singh
Coordinator

Malik Mubasher Hassan
(A.P., ITE)

Nikhil Gupta
(A.P., ITE)

Rakesh Singh Sambyal
(A.P., ITE)

Prof. Asif Husain
Dean, SoET

Baba Ghulam Shah Badshah University
Rajouri (J&K)-185131

Syllabus First to Eighth Semester
B. Tech. Degree Course

(2022-2025)

Department of Computer Science & Engineering
School of Engineering and Technology
Baba Ghulam Shah Badshah University
Rajouri (J&K)-185234

Semester-I

Theory Courses

Course Code	Title	Credits	Scheme of Exam				Hrs./Week		
			Duration (Hrs.)	IA	UE	Total Marks	L	T	P
BSC-CSE-121	Mathematics-I	4	3	40	60	100	3	1	0
BSC-CSE-122	Engineering Chemistry	4	3	40	60	100	3	1	0
BSC-CSE-123	Engineering Physics	4	3	40	60	100	3	1	0
ESC-CSE-121	Basic Electrical Engineering	3	3	40	60	100	3	0	0
ESC-CSE-122	Computer Fundamentals	3	3	40	60	100	3	0	0
MC-CSE-121	Environmental Science*	0	3	40	60	100	2	0	0
Total		**18**		**200**	**300**	**500**			

Laboratory Courses

BSC-CSE-131	Engineering Chemistry Lab	1	2	25	25	50	0	0	2
BSC-CSE-132	Engineering Physics Lab	1	2	25	25	50	0	0	2
ESC-CSE-131	Basic Electrical Lab	1	2	25	25	50	0	0	2
ESC-CSE-132	Engineering Graphics **	3	3	40	60	100	1	0	4
ESC-CSE-133	Computer Fundamentals Lab	1	2	25	25	50	0	0	2
MC-CSE-131	Induction Program	0	-	0	0	0	0	0	2
Total		7		**140**	**160**	**300**			
Total (Theory + Lab)		**25**		**340**	**460**	**800**			

**N.B: 1. ***Environmental science course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks.

2. ** The examination pattern of Engineering Graphics Lab shall be same as of other theory courses.

3. Induction training is also non-credits and the student has to get at-least qualifying attendance to qualify the subject. The student has to qualify this course by attending the training which will be verified by concerned teacher.

Semester-II

Theory Courses

Course Code	Title	Credits	Scheme of Exam				Hrs./Week		
			Duration (Hrs.)	IA	UE	Total Marks	L	T	P
BSC-CSE-221	Mathematics-II	4	3	40	60	100	3	1	0
HSMC-CSE-221	Communication Skills	2	3	40	60	100	2	0	0
ESC-CSE-221	Basic Electronics	3	3	40	60	100	3	0	0
ESC-CSE-222	Engineering Mechanics	3	3	40	60	100	3	0	0
ESC-CSE-223	C-Programming	4	3	40	60	100	3	1	0
MC-CSE-221	Indian Constitution*	0	3	40	60	100	2	0	0
Total		**16**		**200**	**300**	**500**			

Laboratory Courses

HSMC-CSE-231	Comm. Skills Lab	1	2	25	25	50	0	0	2
ESC-CSE-231	Basic Electronics Lab	1	2	25	25	50	0	0	2
ESC-CSE-232	Engineering Mechanics Lab	1	2	25	25	50	0	0	2
ESC-CSE-233	C-Programming Lab	1	2	25	25	50	0	0	2
ESC-CSE-234	Workshop Practice	2	-	50	0	50	0	0	4
Total		**6**		**150**	**100**	**250**			
Total (Theory + Lab)		**22**		**350**	**400**	**750**			

**N.B: 1. ***Indian constitution course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks.

Semester-III

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
BSC-CSE-321	Mathematics-III	4	3	40	60	100	3	1	0
PCC-CSE-321	Data Structures Using C	4	3	40	60	100	3	1	0
PCC-CSE-322	Object Oriented Programming Using C^{++}	4	3	40	60	100	3	1	0
PCC-CSE-323	Software Engineering	3	3	40	60	100	3	0	0
PCC-CSE-324	Operating System	3	3	40	60	100	3	0	0
PCC-CSE-325	Digital Logic Design	4	3	40	60	100	3	1	0
Total		22		**240**	**360**	**600**			

Laboratory Courses

PCC-CSE-331	Data Structures Using C Lab	1	2	25	25	50	0	0	2
PCC-CSE-332	Object Oriented Programming Using C^{++} Lab	1	2	25	25	50	0	0	2
PCC-CSE-333	Digital Logic Design Lab	1	2	25	25	50	0	0	2
Total		3		**75**	**75**	**150**			
Total (Theory + Lab)		25		**315**	**435**	**750**			

Semester-IV

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
PCC-CSE-421	Discrete Mathematics	4	3	40	60	100	3	1	0
PCC-CSE-422	Python Programming	3	3	40	60	100	3	0	0
PCC-CSE-423	Computer Organization & Architecture	4	3	40	60	100	3	1	0
PCC-CSE-424	Database Management System	4	3	40	60	100	3	1	0
PCC-CSE-425	Unix/Linux & Shell Programming	3	3	40	60	100	3	0	0
HSMC-CSE-421	Management Information System	3	3	40	60	100	3	0	0
Total		21		**240**	**360**	**600**			

Laboratory Courses

PCC-CSE-431	Python Programming Lab	1	2	25	25	50	0	0	2
PCC-CSE-432	Database Management System Lab	1	2	25	25	50	0	0	2
PCC-CSE-433	Unix/Linux & Shell Programming Lab	1	2	25	25	50	0	0	2
Total		3		**75**	**75**	**150**			
Total (Theory + Lab)		24		**315**	**435**	**750**			

- At the end of semester IV students are required to attend an Industrial Training-I for 6 weeks duration, during summer vacations in an Organization/Industry/Company. After the completion of training they have to prepare a detailed report of the training work which they have attended. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester V university examination. The evaluation of Industrial Training shall be done during semester V.

Semester-V

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
PCC-CSE-521	Theory of Automata	4	3	40	60	100	3	1	0
PCC-CSE-522	Computer Networks	4	3	40	60	100	3	1	0
PCC-CSE-523	Java Programming	3	3	40	60	100	3	0	0
PCC-CSE-524	Microprocessors and Interfacing	3	3	40	60	100	3	0	0
PEC-CSE-5XX	Professional Elective-I	3	3	40	60	100	3	0	0
OEC-CSE-5XX	Open Elective-I	3/4	3	40	60	100	3	0	0
Total		20/21		**200**	**400**	**600**			

Laboratory Courses

PCC-CSE-531	Computer Networks Lab	1	2	25	25	50	0	0	2
PCC-CSE-532	Java Programming Lab	1	2	25	25	50	0	0	2
PCC-CSE-533	Microprocessors and Interfacing Lab	1	2	25	25	50	0	0	2
PROJ-CSE-521	Industrial Training-I	1	-	50	-	50	0	0	2
Total		4		**125**	**75**	**200**			
Total (Theory + Lab)		24/25		**325**	**475**	**800**			

Professional Elective-I Courses (Code: PEC–CSE-521 to PEC –CSE-526)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-521	Data Warehousing and Data Mining	PEC –CSE-524	Mobile Computing
PEC –CSE-522	Cyber Crime and Laws	PEC –CSE-525	Visual Programming
PEC –CSE-523	Internet and Web Technology	PEC –CSE-526	Advance Data Structures

Open Elective I Courses

CODE	SUBJECT
OEC-CSE-521/ PCC-CE-325	Disaster Preparedness and Planning
OEC-CSE-522/ PCC-CE-524	Concrete Technology
OEC-CSE-523/ PCC-EE-322	Network Analysis and Synthesis
OEC-CSE-524/PEC-EE-721	Wind and Solar Energy Systems
OEC-CSE-525/PCC-ECE-522	Digital Communication Systems
OEC-CSE-526/PEC-ECE-521	Industrial Electronics

- A Minor Project will be allotted to each student/group of students at the end of semester V which has to be completed and shall be evaluated during semester VI.

Semester-VI

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
PCC-CSE-621	Compiler Design	4	3	40	60	100	3	1	0
PCC-CSE-622	Computer Graphics & Multimedia	3	3	40	60	100	3	0	0
PCC-CSE-623	Design & Analysis of Algorithms	4	3	40	60	100	3	1	0
PCC-CSE-624	Artificial Intelligence	3	3	40	60	100	3	0	0
PEC –CSE-6XX	Professional Elective-II	3	3	40	60	100	3	0	0
OEC-CSE-6XX	Open Elective-II	3/4	3	40	60	100	3	0	0
Total		20/21		**240**	**360**	**600**			

Laboratory Courses

PCC-CSE-631	Design & Analysis of Algorithms Lab	1	2	25	25	50	0	0	2
PCC-CSE-632	Computer Graphics & Multimedia Lab	1	2	25	25	50	0	0	2
PROJ-CSE-621	Minor Project	2	2	25	25	50	0	0	4
Total		4		**75**	**75**	**150**			
Total (Theory + Lab)		24/25		**315**	**435**	**750**			

Professional Elective II Courses (Code: PEC–CSE-621 to PEC –CSE-625)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-621	Advanced Java	PEC –CSE-624	Wireless Networks
PEC –CSE-622	Computer Based Numerical Techniques	PEC –CSE-625	Social Network Analysis
PEC –CSE-623	R-Programming		

Open Elective II Courses

CODE	SUBJECT
OEC-CSE-621/ PCC-CE-425	Building Materials & Construction
OEC-CSE-622/ PEC-CE-666	Remote Sensing and GIS
OEC-CSE-623/ PCC-EE-421	Renewable Energy Sources
OEC-CSE-624/ PEC-EE-622	Energy Audit and Management
OEC-CSE-625/ PCC-ECE-421	Signals & Systems
OEC-CSE-626/ PCC-ECE-621	Digital Signal Processing

- At the end of semester VI students are required to attend an Industrial Training-II for 6 weeks duration, during summer vacations in an Organization/Industry/Company. After the completion of training they have to prepare a detailed report of the training work which they have attended. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester VII university examination. The evaluation of Industrial Training shall be done during semester VII.

Semester-VII

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
PROJ-CSE-721	Major Project Phase-I based on Software Engineering	3	2	100	-	100	-	-	6
PCC –CSE-721	Fundamentals of Digital Image Processing	4	3	40	60	100	3	1	0
HSMC-CSE-721	Entrepreneurship Development and Management	3	3	40	60	100	3	0	0
PEC –CSE-7XX	Professional Elective-III	3	3	40	60	100	3	0	0
PEC –CSE-7XX	Professional Elective-IV	3	3	40	60	100	3	0	0
OEC-CSE-7XX	Open Elective-III	3	3	40	60	100	3	0	0
Total		19		**300**	**300**	**600**			

Laboratory Courses

PCC –CSE-731	Fundamentals of Digital Image Processing Lab.	1	2	25	25	50	0	0	2
PROJ-CSE-722	Seminar on latest Trends	1	-	50	-	50	0	0	2
PROJ-CSE-723	Industrial Training-II	1	-	50	-	50	0	0	2
Total		3		**125**	**25**	**150**			
Total (Theory + Lab)		22		**425**	**325**	**750**			

Professional Electives III Courses (Code: PEC –CSE-721 to PEC –CSE-725)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-721	Cryptography and Network Security	PEC –CSE-724	Distributed Database System
PEC –CSE-722	Internet of Things	PEC –CSE-725	Advance Algorithms
PEC –CSE-723	Machine Learning		

Professional Electives IV Courses (Code: PEC –CSE-726 to PEC –CSE-730)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-726	Advanced Multimedia System	PEC –CSE-729	Real Time Operating System
PEC –CSE-727	Cloud Computing	PEC –CSE-730	Blockchain Technologies
PEC –CSE-728	Big Data Analysis	PEC –CSE-731	Advanced Mobile Communications

Open Elective III Courses

CODE	SUBJECT
OEC-CSE-721/ PCC-CE-522	Environmental Engineering
OEC-CSE-722/ PEC-CE-770	Air and Noise Pollution Control
OEC-CSE-723/ PCC-EE-522	Power System-I
OEC-CSE-724/ PEC-EE-721	Wind and Solar Energy Systems
OEC-CSE-725/ PEC-ECE-723	Advanced 3G and 4G Wireless & Mobile Communication
OEC-CSE-726/ PEC-ECE-725	Biomedical Instrumentation

- During semester VII every student shall be allotted a Major Project Phase-I based on Software Engineering under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Project under the supervision of their allotted mentor. Major Project Phase-I based on Software Engineering is to be completed during semester VII and shall be evaluated internally as per university statutes by a committee consisting of:
    i) Head of the Department
    ii) One member nominated by Principal
    iii) Coordinator(s)/Supervisor(s)/Mentor(s) of project

Semester-VIII

Theory Courses

Course Code	Title	Credits	Scheme of Examination				Hrs./Week		
			Duration (hrs)	IA	UE	Total Marks	L	T	P
PROJ-CSE-821	Major Project-Phase II	8	2	250	200	450	-	-	16
PEC –CSE-8XX	Professional Elective-V	3	3	40	60	100	3	0	0
PEC-CSE-8XX	Professional Elective-VI	3	3	40	60	100	3	0	0
Total		14		330	320	650			

Professional Electives V Courses (Code: PEC –CSE-821 to PEC –CSE-825)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-821	Advanced Computer Architecture	PEC –CSE-824	Research Methodology
PEC –CSE-822	Expert System	PEC –CSE-825	Software Project Management
PEC –CSE-823	Neural Networks		

Professional Electives VI Courses (Code: PEC –CSE-826 to PEC –CSE-830)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-826	Software Testing	PEC –CSE-829	Deep Learning
PEC –CSE-827	Distributed Computing	PEC –CSE-830	Bio-Metrics and Network Security
PEC –CSE-828	Natural Language Processing	PEC –CSE-831	Design Patterns

- After completing the Major Project-Phase I in semester VII the students are required to complete the Major Project- Phase II during semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the students shall be offered in house project on campus or they can complete their project work in any organization/industry outside the campus. Major Project- Phase II shall be evaluated as per university statues.
- **Open Elective-I, Open Elective-II, and Open Elective-III** are the courses to be taken by CSE students from other technical departments, each of three (approx.) credits.
- For each theory course the assessment pattern will be as shown in table 1.

Table 1: Distribution of Weightage for theory courses of 100 marks.

Continuous Assessment		University Examination	
Component	**Weightage**	**Component**	**Weightage**
Cyclic Test 1	10	Written Examination	60
Cyclic Test 2	10		
Assignments	10		
Attendance	10		
Total	**40**		**60**

- For laboratory courses the assessment pattern will be as shown in table 2.

Table 2 Distribution of Weight age for laboratory courses of 50 marks.

Continuous Assessment		**University Examination**	
Component	**Weightage**	**Component**	**Weightage**
Continuous assessment of practical work, timely submission of lab records	15	Lab experiment/procedure/ writing /tabulation/innovation as applicable	15
Attendance	05	Viva Voce	10
Test and Viva Voce	05		
Total	**25**		**25**

Summary of Credits

Basic Science Course

S. No.	Course Code	Subject	Semester	Credits
1	BSC-CSE-121	Mathematics-I	I	4
2	BSC-CSE-122	Engineering Chemistry	I	4
3	BSC-CSE-123	Engineering Physics	I	4
4	BSC-CSE-131	Engineering Chemistry Lab	I	1
5	BSC-CSE-132	Engineering Physics Lab	I	1
6	BSC-CSE-221	Mathematics-II	II	4
7	BSC-CSE-321	Mathematics-III	III	4
			Total Credits:	**22**

Engineering Science Course

S. No.	Course Code	Subject	Semester	Credits
1	ESC-CSE-121	Basic Electrical Engineering	I	3
2	ESC-CSE-122	Computer Fundamentals	I	3
3	ESC-CSE-131	Basic Electrical Lab	I	1
4	ESC-CSE-132	Engineering Graphics	I	3
5	ESC-CSE-133	Computer Fundamentals Lab	I	1
6	ESC-CSE-221	Basic Electronics	II	3
7	ESC-CSE-222	Engineering Mechanics	II	3
8	ESC-CSE-223	C-Programming	II	4
9	ESC-CSE-231	Basic Electronics Lab	II	1
10	ESC-CSE-232	Engineering Mechanics Lab	II	1
11	ESC-CSE-233	C-Programming Lab	II	1
12	ESC-CSE-234	Workshop Practice	II	2
			Total Credits:	**26**

Humanities & Social Sciences Including Management Courses

S. No.	Course Code	Subject	Semester	Credits
1	HSMC-CSE-221	Communication Skills	II	2
2	HSMC-CSE-231	Communication Skills Lab	II	1
3	HSMC-CSE-421	Management Information System	IV	3
4	HSMC-CSE-721	Entrepreneurship Development and Management	VII	3
			Total Credits:	**9**

Mandatory Courses

S. No.	Course Code	Subject	Semester	Credits
1	MC-CSE-121	Environmental Science	I	0
2	MC-CSE-131	Induction Program	I	0
3	MC-CSE-221	Indian Constitution	II	0
			Total Credits:	**0**

Program Core Courses

S. No.	Course Code	Subject	Semester	Credits
1	PCC-CSE-321	Data Structures Using C	III	4
2	PCC-CSE-322	Object Oriented Programming Using C^{++}	III	4
3	PCC-CSE-323	Software Engineering	III	3
4	PCC-CSE-324	Operating System	III	3
5	PCC-CSE-325	Digital Logic Design	III	4
6	PCC-CSE-331	Data Structures Using C Lab	III	1
7	PCC-CSE-332	Object Oriented Programming Using C^{++} Lab	III	1
8	PCC-CSE-333	Digital Logic Design Lab	III	1
9	PCC-CSE-421	Discrete Mathematics	IV	4
10	PCC-CSE-422	Python Programming	IV	3
11	PCC-CSE-423	Computer Organization & Architecture	IV	4
12	PCC-CSE-424	Database Management System	IV	4
13	PCC-CSE-425	Unix/Linux & Shell Programming	IV	3
14	PCC-CSE-431	Python Programming Lab	IV	1
15	PCC-CSE-432	Database Management System Lab	IV	1
16	PCC-CSE-433	Unix/Linux & Shell Programming Lab	IV	1
17	PCC-CSE-521	Theory of Automata	V	4
18	PCC-CSE-522	Computer Networks	V	4
19	PCC-CSE-523	Java Programming	V	3
20	PCC-CSE-524	Microprocessors and Interfacing	V	3
21	PCC-CSE-531	Computer Networks Lab	V	1
22	PCC-CSE-532	Java Programming Lab	V	1
23	PCC-CSE-533	Microprocessors and Interfacing Lab	V	1
24	PCC-CSE-621	Compiler Design	VI	4
25	PCC-CSE-622	Computer Graphics & Multimedia	VI	3
26	PCC-CSE-623	Design & Analysis of Algorithms	VI	4
27	PCC-CSE-624	Artificial Intelligence	VI	3
28	PCC-CSE-631	Design & Analysis of Algorithms Lab	VI	1
29	PCC-CSE-632	Computer Graphics & Multimedia Lab	VI	1
30	PCC –CSE-721	Fundamentals of Digital Image Processing	VII	4
31	PCC –CSE-731	Fundamentals of Digital Image Processing Lab.	VII	1
			Total Credits:	**80**

Professional Elective Courses

S. No.	Course Code	Subject	Semester	Credits
1	PEC-CSE-(--)	Professional Elective courses-I	V	3
2	PEC-CSE-(--)	Professional Elective courses-II	VI	3
3	PEC-CSE-(--)	Professional Elective courses-III	VII	3
4	PEC-CSE-(--)	Professional Elective courses-IV	VII	3
5	PEC-CSE-(--)	Professional Elective courses-V	VIII	3
6	PEC-CSE-(--)	Professional Elective courses-VI	VIII	3
			Total Credits:	**18**

Open Elective Courses

S. No.	Course Code	Subject	Semester	Credits
1	OEC-CSE-(--)	Open Elective courses-I	V	3/4
2	OEC-CSE-(--)	Open Elective courses-II	VI	3/4
3	OEC-CSE-(--)	Open Elective courses-III	VII	3/4
			Total Credits:	**9 to 12**

Project/Internship/ Seminar

S. No.	Course Code	Subject	Semester	Credits
1	PROJ-CSE-521	Industrial Training-I		1
2	PROJ-CSE-621	Minor Project		2
3	PROJ-CSE-721	Major Project Phase-I based on Software Engineering		3
4	PROJ-CSE-722	Seminar on latest Trends		1
5	PROJ-CSE-723	Industrial Training-II		1
6	PROJ-CSE-821	Major Project-Phase II		8
			Total Credits:	**16**

Total Credits=180

Note: Subjected to the condition that Open Electives are of 3 Credits

Semester-I

Course Title: Mathematics-I **Max. Marks: 100, Credits: 04[3-1-0]**

Course Code: BSC-CSE-121 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course is designed to impart elementary knowledge of theory of calculus, linear algebra and sequence & series to engineering students that will serve them to solve various engineering problems.

Unit-I

Differential Calculus: Rolle's Theorem, Mean value theorems, indeterminate forms and L'Hospital's rule; Successive differentiation and Leibnitz's theorem, Taylor's and Maclaurin's series of function of single variable, Expansion of functions of single variable.

Unit-II

Multivariable Calculus (Differentiation) : Limit, continuity and partial derivatives, physical significance of partial derivative, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

Unit-III

Integral Calculus: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV

Sequences and series: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sineand cosine series, Parseval's theorem.

Unit-V

Matrices: Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Course Outcomes:

Upon the successful completion of the course, the student will be able to:

1. Understand the significance of Rolle's Theorem, Mean Value theorem, Taylor's and Maclaurin's series for differentiable functions.
2. Identify the extrema of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.
3. Use basic the integral rules to evaluate both definite and indefinite integrals and apply the same to find areas and volume of revolutions. Apart from these, they have a basic understanding of Beta and Gamma functions.
4. Apply the tools of power series and Fourier series to deal with functions of several variables that are essentials in most branches of engineering.
5. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

Text Books:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. D. Zill, Advanced Engineering Mathematics, Jones & Bartlett
3. N. Piskunov, Differential & Integral calculus, Vol-I & II.
4. Jain &Iyengar, Advanced Engineering Mathematics, Narosa Publishers

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Semester-I

Course Title: Engineering Chemistry **Max. Marks: 100, Credits: 04[3-1-0]**

Course Code: BSC-CSE-122 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course is designed to familiarizing the students of engineering with Water treatment, polymerization, photochemistry, corrosion and transition metal chemistry.

Unit-I

WATER TREATMENT: Water quality measurement, Hardness of water, Estimation of hardness of water, Disadvantages of hard water ,Scale and sludge formation; disadvantages, prevention and treatment, Desalination method, reverse osmosis ,Electro dialysis, Domestic water treatment.

Unit-II

POLYMERISATION: Basic concept of polymerization, Broad classification and industrial applications (Buna-N, Buna-S, Polyester, Polyethene, Polypropene, Polystyrene,), Thermosetting plastic and its softening, Biodegradable and non-biodegradable wastes.

Unit-III

PHOTOCHEMISTRY: Photo excitation, Luminescence and types, Norrish-I and Norrish-II reactions, Application examples of photolysis, Photosynthesis Z –Diagram, Chemistry of vision, MRI equipment and procedure of working.

Unit-IV

TRANSITION METAL CHEMISTRY: Structure of organic compounds up to coordination no 6, Isomerism (geometrical, optical, ionisation, linkage and coordination isomerism, bonding in coordination compounds by CFT, VBT. Application of coordination compounds in organic synthesis and Medical fields.

Unit-V

CEMENT AND LIME: Introduction and types of cement, Manufacture of Portland Cement, Setting and hardening of cement, Introduction and properties of Lime, Setting and hardening of lime.

COURSE OUTCOME: At the end of course, the student will be able to

1. Apply the methods to produce soft water for industrial use and potable water at cheaper cost.
2. Substitute metals with conducting polymers and also produce cheaper bio-degradable polymers to reduce environmental pollution,
3. Apply knowledge about photochemical and photo physical processes and the reactivity of excited states to explain applications in photochemical energy conversion.
4. Understand structure of organic compounds and transition metal compound synthesis,
5. Understand the manufacturing process of cement and lime.

Books Recommended:

1. Odion G.G-Principles of Polymerisation, John Wiley and sons.
2. S.S Dara-A Text Book of Engg. Chemistry.
3. B.Sivasankar-Engineering Chemistry, Tata Mc Graw Hill Publication.
4. S.Chand-Practical Manual for Engineering Chemistry.

Note for Paper Setter: The **Question** paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester-I

Course Title: Engineering Physics **Max. Marks: 100, Credits: 04[3-1-0]**

Course Code: BSC-CSE-123 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

COURSE OBJECTIVE:

1. To understand the importance of applications of Applied Physics in daily life
2. To provide the students with a basic understanding of Physics that may be required by engineers in the course of their careers
3. To acquaint students with the fundamentals of vibrations, acoustics and ultrasonic and how they help in mankind by using engineering skills.
4. To enhance knowledge related to principle working of Lasers and its different components to make it suitable for various purposes
5. To introduce the learners to the basics of Quantum Mechanics

Unit-I

WAVES, OSCILLATIONS AND INTRODUCTION TO ACOUSTICS: Wave motion, its types, Equations of wave motion, Energy and Intensity of a progressive wave, Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves, their detections and applications. A brief introduction to the acoustics of a hall, factors affecting the acoustics of the buildings, Reverberation Period, Sabine's Formula for calculating Reverberation Time.

Unit-II

ELECTROSTATICS IN A LINEAR DIELECTRIC MEDIUM & MAGNETOSTATICS: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; solving simple electrostatics problems in presence of dielectrics – Point charge at the centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. Magneto statics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Unit-III

QUANTUM MECHANICS FOR ENGINEERS: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets.

Unit-IV

APPLYING THE SCHRODINGER EQUATION: Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator.

Unit-V

OPTICS: Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings. Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra. Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

Course Outcomes: After completing of the course, the students will:

1. Understand the importance of Applied Physics in describing the technology we are using today in different engineering fields
2. Acquired knowledge of Waves, Vibration and acoustics, helps the students to develop the acoustically good hall.
3. Knowledge of basic Quantum Mechanics can help the students for further research applications as they can be applied to any quantum, mechanical situation to find energy, momentum etc.
4. Acquired knowledge of Optics help the students to
   a) Know more about propagation of light and wave optics.
   b) Describe the requirements for a system to act as a laser.
   c) Differentiate the various types of lasers and their means of excitation.
   d) Able to explain, which laser would best meet the need for a industrial or research task.
   e) Demonstrate an awareness of the safety responsibilities involved in working with lasers.

Suggested Reference Books:

1. **Pathania K. S. &Khera S. K.,** Waves and Vibration,
2. **Beiser**, **Arthur**, Concepts of Modern physics, TMH.
3. **Rangwala** and **Mahajan**, "Electricity and Magnetism", Tata McGraw Hill, 1998
4. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves,
5. **David J. & Cheek**, Fundamentals and application of ultrasonic waves,
6. **Avadhanulu M. N. &Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
7. **Vijaya K. K., Chandralingam S.,** Modern Physics, S. Chand & Co. Ltd, New Delhi
8. **Mani and Mehta**, G.K. "Modern Physics", Affiliated East-West Press Pvt. Ltd., 1998.
9. **Arora C.L**, Refresher Course in Physics, S. Chand & Company Ltd.
10. **Grifiths David J.,** Introduction to Quantum Mechanics, 2nd Edition 2016, Cambridge University Press
11. **Sharma K. K.**, Optics: Principles and Applications 2017, Elsevier
12. **Shankar R.**, Principles of Quantum Mechanics 2011, Springer
13. **Jenkins & White H E**, Fundamentals of Optics 4 edition 2017, McGraw Hill Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student must attempt five questions at least one from each unit.

Semester-I

Course Title: Basic Electrical Engineering **Max. Marks: 100, Credits: 03[3-0-0]**

Course Code: ESC-CSE-121 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course has been designed to provide basic knowledge to the students about the principles of electric circuit analysis, electromagnetism and transformers.

Detailed Contents:

Unit-I

Review of Electric Circuits: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance. Capacitance), ohm's law, Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage & current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C Circuit Analysis: Power & energy relations, analysis of series parallel DC circuits, Star-Delta transformations (ΔY), Loop & Nodal methods, Network Theorems: Thevenin's,Norton's, Maximum Power Transfer and Superposition Theorems (D.D Analysis only).

Unit-III

A.C. Circuit Analysis: Basic terminology and definitions, phasor and complex numberrepresentations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers,Introduction to 3 phase circuits.

Unit-IV

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law,analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-V

Basic Electrical Installations: Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction,classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcome:

At the end of this course, students will demonstrate the ability

CO1. To understand the concepts and applications of different laws used in the networks and circuits.

CO2. To study and analyze the D.C. Circuit and A.C. Circuit with different theorem.

CO3. To study the concepts related to electromagnetism.

CO4. To understand the principle and working of transformers.

CO5. To study and understand different types of electrical installations.

Text Books/ References:

1. **V. D. Toro**, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
2. **L. S. Bobrow**, "Fundamentals of Electrical Engineering", Oxford University Press,2011.
3. **E. Hughes**, "Electrical and Electronics Technology", Pearson, 2010.
4. **D. P. Kothari and I. J. Nagrath**, "Basic Electrical Engineering", Tata McGraw Hill,2010.
5. **D. C. Kulshreshtha**, "Basic Electrical Engineering", McGraw Hill, 2009.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester-I

Course Title: Computer Fundamentals **Max. Marks: 100, Credits: 03[3-0-0]**

Course Code: ESC-CSE-122 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is provided aiming to achieve a basic knowledge of computer and its programming among engineering students.

Unit-I

Introduction: History and Generations of Computers, Classification and Applications of Computers. Computer Hardware: Components of a computer system, Input and Output devices, Memory Hierarchy, Primary and Secondary memory. Computer Software, System and Application Software, Utility Programs.

Unit-II

Operating systems, Functions and types of O/S, DOS commands, BIOS, POST, Booting Process, Computer Virus, Types of Viruses, Use of Antivirus software.

Computer Languages (Machine, Assembly and High level languages), Translators (Assembler, Compiler and Interpreter). Introduction to algorithm and Flow chart:

Unit-III

Number System: Data Representation, Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Networking: Introduction to networking, Applications, types of computer networks, Network Topology, LAN, MAN, WAN. Networking devices: Hub, switch, router, repeater, and gateway. History of Internet, Internet, extranet and intranet, WWW, E-mail, ISPs, surfing, phishing.

Unit-V

Introduction to HTML: Introduction to HTML. Working of HTML, Creating and loading HTML page, tags, Structure of HTML, Document, Stand Alone Tags, Formatting text, Adding Images, Creating hyper Links, Tables, Sending E-mails through Web Page, Sample web pages.

Course Outcomes:

1. Know the basic components of the computer and working of each device.
2. Understand the functions of Operating System, softwares and DoS Commands.
3. Understand the representation of data in computer.
4. Know the fundamentals of Computer Networking.
5. Know the basics of HTML.

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester-I

Course Title: Environmental Science **Max. Marks: 100, Credits: 0[2-0-0]**

Course Code: MC-CSE-121 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is designed to make the engineering students to understand the significance of environment and ecology in human survival and growth. It also aims to connect the budding engineers to nature.

Unit-I

ELEMENTS OF ECOLOGY: Definition, Scope and basic principles of ecology and environment. Biological levels of organization, population, community, ecosystem and bio-sphere. Climatic factors - Solar radiations, temperature, water and precipitation.

Unit-II

ENVIRONMENTAL POLLUTION: Types of pollution, Air pollution, Noise pollution, Water pollution, Soil pollution, Thermal pollution, Radiation pollution

Unit-III

BIOGEOCHEMICAL CYCLES: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Global Oxygen Cycles. Hydrological cycles.

Unit-IV

SUCCESSION: Concepts of succession, Types of Succession, Trends in succession, Climax and stability, Co-evolution and group selection.

Unit-V

MAJOR BIOMES OF THE WORLD: Characteristics of terrestrial fresh water and marine ecosystems; Forests, grasslands, lake, river and marine ecosystems of India.

COURSE OUTCOMES: Upon the completion of the course, students will able to:

1. Learn about the environment and ecology.
2. Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
3. Understand biogeochemical cycles and human contribution in it.
4. Learn succession and various types of succession.
5. Demonstrate the ability to understand the biomes of world and its importance in human survival.

Books Suggested:

1. J.S.Singh, S.P. Singh and S.R. Gupta. 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).
2. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
3. M.H. Rao and H.V.H. Rao. 1998. Air Pollution. Tata McGraw Hill Publication.
4. V.P. Kudesia. 1997. Air Pollution. PragatiPrakashan.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester-I

Course Title: Engineering Chemistry Lab. **Max. Marks: 50, Credits: 1[0-0-2]**

Course Code: BSC-CSE-131 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objectives: The course is designed to provide experimental foundation for the scientific method for analysis, synthesis and determination of various chemicals

LIST OF EXPERIMENTS:

1. Acid Base Titrations.
2. Viscosity of Solutions, Determination of composition of sugar solutions from Viscosity.
3. Synthesis of Aspirin.
4. Determination of Functional Groups in Organic Compounds.
5. Synthesis pf p-Nitro Aniline from Acetanilide.
6. Conduct metric Titrations.
7. Determination of Proteins in given sample of Food.
8. Determination of Flash and Fire Point of a Lubricant.

Lab. Outcomes:

At the end of practical course the students will be familiarized about Titrations, Synthesis of organic compounds, protein determination and viscosity of solutions and temperature dependent properties of lubricant.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Engineering Physics Lab. **Max. Marks: 50, Credits: 1[0-0-2]**

Course Code: BSC-CSE-132 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objectives: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with experimental apparatus, the scientific method and method of data analysis.

List of Experiments: (Perform any 08)

1. Measurement of Resistance.
2. Measurement of e/m by Helical method/Thomson's method.
3. Determination of Resistivity of a given wire.
4. Determination of Band Gap of a semiconductor.
7. To determine the refractive index of the prism material using spectrometer.
8. To determine Young's modulus of a bar.
9. To determine the wavelength using Fresnel's bi-prism/diffraction grating.
10. To Determine Plank's Constant.
11. Verify the Stefan's law by incandescent lamp
12. To determine the susceptibility of a ferromagnetic material
13. Study of nano TiO2 solar cell
14. Ultrasound measurement a given liquid
15 Joule's constant experiment
16. Determination of unknown capacitance of a capacitor by de-Sauty bridge method.
17. Refractive index of a glass slab/ water by travelling microscope
18. To determine the frequency of an ac supply by using electrical vibrator
19. To find the inner and outer diameter of a hollow cylinder by using Vernier caliper.
20. To determine the diameter of a thin wire by using screw gauge and its area of cross section.
21. Measurement of 'g' and Time period by using compound pendulum.
22. To find the viscosity of a liquid using stoke's method.

Lab Outcomes: On Completion of this course, students are able to –

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.
5. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Basic Electrical Lab **Max. Marks: 50, Credits: 1[0-0-2]**

Course Code: ESC-CSE-131 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objective: The lab has been designed to provide and implement basic knowledge about the principles of electric circuit analysis, electromagnetism and transformers to the students.

List of experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin's Theorem & Norton's Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Laboratory Outcomes

1. To study and analyze different circuit elements.
2. To study and implements different laws and theorems of electrical circuits.
3. To make the students aware about the principles and applications of basic electrical laws.
4. To measure the power using two wattmeter method.
5. To study and analyze the phenomenon of Resonance in Series and Parallel circuits.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Engineering Graphics **Max. Marks: 100, Credits: 3[1-0-4]**
Course Code: ESC-CSE-132 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objectives: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses. Projections: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloids, Hypocycloid and Involute;Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of Straight Line and their Traces: Projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of Surfaces: Definition of sectioning & its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Sectional orthographic views of geometrical solids, Purpose of development, Development of prism,cylinder,cone & pyramid surface

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection Isometric Views of lines, Planes, Simple and compound Solids, Difference between isometric projection and Isometric view, Isometric projection of solids such as cube, prism, pyramid and cylinder. Introduction to computer aided drafting (CAD)

Lab. Outcomes: On completion of course students must be able

1. To read Engineering Drawing and execute the construction work with the help of available drawing
2. To represent three dimensional objects by two dimensional views.
3. Students must be in a position to show hidden details of objects or underground constructions work by drawing sectional views.
4. Exposure to creating working drawings
5. Exposure to the visual aspects of engineering design

Text Books:

1. **Bhat, N. D. & Panchal, V. M,** *Engineering Drawing*, Charotar Publishers, Anand.
2. **Narayana, K. L. & Kannaiah P,** *Engineering Graphics*, Tata McGraw Hill, New Delhi.
3. **Shah, M.B. & Rana B.C. (2008),** Engineering Drawing and Computer Graphics, Pearson Education
4. **Agrawal B. & Agrawal C. M. (2012),** Engineering Graphics, TMH Publication.

Reference Books:

1. **Gill P. S.,** *Engineering Graphics and Drafting*, Katria and Sons, Delhi.
2. **Luzzadde Warren J.,** *Fundamentals of Engineering Drawing*, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit. Questions must be set in such a way that the students be able to answer 5 questions within 3 hours.

Semester-I

Course Title: Computer Fundamentals Lab **Max. Marks: 50, Credits: 1[0-0-2]**

Course Code: ESC-CSE-133 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objective: The lab has been designed to provide and implement basic knowledge about the computer fundamentals to the students.

List of Experiments:

1. Experiments on dismantling of PC.
    a. Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components.
2. Perform these DOS commands
    a. Internal commands.
    DIR, TYPE, DEL, ERASE, MD, CD, COPY, RMDIR, VER, DATE, TIME, PATH, CLS, RMDIR, VER, DATE, TIME, PATH, CLS, BREAK, SET, EXIT.
    b. External commands.
    APPEND, CHKDISK, ATTRIB, SYS, EDIT.
3. Experiments on system utilities
    a. Explore and describe some system utility like regedit, memory partioning, control panel, window tools.
4. MS-Word: Introduction, Starting MS-Word, MS-Word Screen and its Components, Elementary Working with MS-Word.
5. MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
6. Create a spreadsheet of students, which contains marks obtained by students of a class in different subjects and then calculate maximum, minimum, average and sum of marks in each subject. Also calculate % of each student using functions and formulas in MS-Excel also draw pie chart and bar graph also.
7. MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.
8. Make a simple presentation on your college, use 3D effects, animation on network topologies.
9. Create HTML pages for your business website.
10. Create HTML pages showing timetable of trains departing from Jammu-Tawi railway station.
11. Create web pages for your college.

Lab Outcomes: Upon the completion of course, the students will be able to:

1. Working on various Operating Systems and their usage
2. Understand and use MS-Office to create documents
3. Understand the basic DoS Commands
4. Recognize Hardware components and their assembly
5. Install Operating system on Hardware and working on HTML

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Induction Program **Max. Marks:N/A, Credits: 0[0-0-2]**

Course Code: MC-CSE-131 **University Examination: N/A**

Duration of Exam: N/A **Internal Assessment: N/A**

Induction program

Induction program for students to be offered right at the start of the first year. It should include but not limited to following Activities

1. Physical activity
2. Creative Arts
3. Universal Human Values
4. Literary
5. Proficiency Modules
6. Lectures by Eminent People
7. Visits to local Areas
8. Familiarization to Dept./Branch & Innovations

Semester II

Course Title: Mathematics-II **Maximum Marks: 100, Credits: 04[3-1-0]**

Course Code: BSC-CSE-221 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is designed to impart advanced knowledge of multivariable integration, theory of differential equations and complex variable to engineering students that will serve them to solve real life engineering problems.

Unit- I

Multivariable Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, spheres and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes' (without proofs).

Unit- II

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Second order linear differential equations with variable coefficients, method of variation of parameters.

Unit- III

Partial Differential Equations: Partial differential equations and its formation, Linearand non-linear partial differential equations of first order and their solutions, Charpit's method, Lagrange's method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions, Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables.

Unit- IV

Complex Variable – Differentiation: Differentiation, Cauchy-Riemann equations, analytic functions, elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit- V

Complex Variable – Integration: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem (without proof) and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Course Outcomes: Upon the completion of this course, the students will be able to:

1. Compute double and triple integrals over rectangular and spherical domains and memorize important theorems: Green, Gauss divergence and Stokes with their applications in various engineering problems.
2. Distinguish between linear and non-linear equations. Recognize and solve equations of Bernoulli, Euler and Clairaut.
3. Solve partial differential equations of various kinds and apply the same to solve problems of real world.
4. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.
5. Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.

Text Books

1. **Erwin Kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics**,** Jones & Bartlett.
3. **N. Piskunov,**Differential& Integral calculus, Vol-I & II
4. **Jain &Iyengar**, Advanced Engineering Mathematics, Narosa Publishers

Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
4. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
   J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester II

Course Title: Communication Skills **Max. Marks: 100, Credits: 02[2-0-0]**

Course Code: HSMC-CSE-221 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This subject is designed to attain the general proficiency in English language for the engineering students.

Unit-I

Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives., Synonyms, antonyms, and standard abbreviations.

Unit-II

Basic Writing Skills: Use of phrases and clauses in sentences, Importance of proper punctuation,Memos,Enquiry letter, Job Application letter, Adjustments and Sales letters, Techniques for writing precisely.

Unit-III

Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Articles, Prepositions, Redundancies and Clichés.

Unit-IV

Speaking skills- Interviews-Meaning, types of Interview, notices, Agenda, Minutes of meeting, writing introduction and conclusion.

Unit-V

Writing Practices: Comprehension, Précis Writing, Essay Writing.

Course Outcomes: Upon the completion of the course, the students will be able:

1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. To make the students authoritative in self-expression in their day to day life in this fast-changing world.
3. To identify the common errors involved in writing.
4. To understand the nature and style of sensible writing.
5. To write effective and coherent paragraphs.

Text Books:

1. **Liz Hamp-Lyons and Ben Heasly**, Study Writing,Cambridge University Press,2006.
2. **Sanjay Kumar and Pushp Lata,**Communication Skills,Oxford University Press, 2011.
3. **CIEFL,** Exercises in Spoken English. Parts. I-III. Hyderabad. Oxford University Press

Reference Books:

1. **Michael Swan**, Practical English Usage,OUP,1995.
2. **F.T. Wood, Macmillan** ,Remedial English Grammar,2007

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester-II

Course Title: Basic Electronics **Max. Marks: 100, Credits: 03[3-0-0]**

Course Code: ESC-CSE-221 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semiconductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semiconductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, use of transistor as a switch.

Unit-IV

Biasing Techniques and biasing stability (BJT):- Need for biasing, operating point, load line analysis, bias stability. fixed bias configuration, emitter bias configuration, voltage divide bias configuration, analysis of these biasing techniques.

Unit-V

Field Effect Transistors: Operation and characteristics of JFET and MOSFET, types of MOSFET, Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Colpitts and Phase Shift oscillators (transistor version only and no derivation).

Course Outcomes: At the end of the course, the student will be able to:

- **CO1.** Describe the energy bands and the scientific principles behind conductivity in semiconductors.
- **CO2.** Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
- **CO3.** Analyze the working of various traditional transistors such as BJT and FET along with the recently used MOSFET based transistors as well as the concept of biasing in these transistors.
- **CO4.** Understand various feedback systems and oscillators.
- **CO5.** Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Sedra & Smith,** Microelectronic Circuits, Oxford Printing Press.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: Engineering Mechanics **Max. Marks: 100, Credits: 03[3-0-0]**

Course Code: ESC-CSE-222 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course has been designed to make the students acquainted about forces and its effects, kinematics and statics.

Unit-I

Two Dimensional force System: Basic Concepts, principal of transmissibility, resultant of a force System, Free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, Varrigon theorem, friction, law of friction, equilibrium of body lying on horizontal and inclined plane, Static and Dynamic Friction, wedge friction, Ladder friction applications.

Unit-II

Centroid and Centre of gravity: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration composite ideas. Mass moment inertia of circular plate, Cylinder, Sphere.

Unit-III

Member forces in Trusses: Planer truss structure, trust joint identification, strategy for planer truss analysis, Statistical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of sections).

Unit-IV

Kinematics of Particles: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies rotation, absolute motion, relative motion. Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

Unit-V

Virtual Work and Energy Method- Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

Course Out-come: Upon successful completion of the course, student should be able to:

1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures
2. Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts);
3. Understand basic dynamics concepts – force, momentum, work and energy;
4. Understand and be able to apply Newton's laws of motion;
5. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy;

Text Books:

1. **Bansal R.K. (2010),** A Text Book of Engineering Mechanics, Laxmi Publications
2. **Khurmi R.S. (2010),** Engineering Mechanics, S. Chand & Co.

Reference Books:

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall
2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill
3. R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
4. Andy Ruina and RudraPratap (2011), Introduction to Statics and Dynamics, Oxford University Press
5. Shanes and Rao (2006), Engineering Mechanics, Pearson Education,
6. Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson Education
7. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer's Engineering Mechanics

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester II

Course Title: C- Programming **Max. Marks: 100, Credits: 04[3-1-0]**

Course Code: ESC-CSE-223 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is provided aiming to enhance the logical skills of engineering students with the basic programming concepts and implementation in C Programming.

Unit-I

Introduction to C Programming: Overview of programming languages, algorithms and flowcharts, History of C, Structure of a C Program, Compiling & Executing a C program. Constants, Variables and Data Types, Storage classes, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Looping: while statement, do-while statement, for statement.

Unit-III

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, strings, basic string operations**.**

User defined data types: Structure, Defining structures, Array of Structures, Introduction to Union and enumerated data types.

Unit-IV

Functions: Introduction to Function, Types of functions, function declaration, calling a function, passing arguments to functions, passing arrays to functions, Recursion.

Unit-V

Introduction to Pointers & Files: Operations on pointer, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Introduction to File, Operations on files: open, close, read and write.

Course Outcomes: The student will be able:

1 To translate the algorithms and flowcharts to programs (in C language) for execution.
2 To make the usage of various control statements for developing an efficient program to solve the problems.
3 To decompose a complex problem into functions for solving it efficiently.
4 To use the arrays and user defined data types for synthesizing a complete program.
5 To use pointers, files and dynamic memory allocations to perform several operations in programs.

Text Books

1. **Brian W. Kernighan and Dennis Ritchie,** The C Programming Language, Pearson, 2nd Edition
2. **Yashavant P. Kanetkar ,** Let Us C, BPB Publication, 15th Edition.
3. **Gottfried**, Programming with C, TMH.

Reference Books

1. **E. Balaguruswamy**, Programming in ANSI C, Tata McGraw-Hill.
2. **Venugopal**, C Programming, TMH.
3. **Yashwant Kanitkar**, Pointers in C, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester II

Course Title: Indian Constitution **Max. Marks: 100, Credits: 0[2-0-0]**

Course Code: MC-CSE-221 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The basic purpose of this subject is to make a general awareness about our constitution.

Unit-I

Constitutional Framework: Historical Background, Making of the constitution, Salient features of the Indian Constitution, Preamble to the Constitution, Union and its territory, Citizenship, Fundamental rights, Directive principles of state policy, Fundamental duties, Amendment of the constitution, Basic structure of the constitution.

Unit-II

System of Government: Parliamentary system, Federal System, Centre-state relations, Inter-state relations, Emergency provisions

Unit-III

Central Government: President, Vice-President, Prime Minister, Central Council of Ministers, Cabinet committees, Parliament, Parliamentary committees, Parliamentary forums, Supreme Court

State Government: Governor, Chief Minister, State Council of Ministers, State legislature, High court, Subordinate Courts, Special status of Jammu and Kashmir, Special provision for some states

Local Government: Panchayati raj, Municipalities

Unit-IV

Constitutional Bodies: Election commission, Union Public service commission, State Public Service Commission, Finance Commission, National Commission for SC's, National Commission for ST's, Special officer for Linguistic minorities, Comptroller and auditor general of India, Attorney General of India, Advocate General of India.

Unit-V

Non-Constitutional Bodies: Planning Commission, National Development Council, National Human Rights Commission, State Human Rights Commission, Central Information Commission, State Information Commission, Central vigilance Commission, Central Bureau of Investigation, Lokpal and Lokayuktas.

Other Constitutional Dimensions: Co-operative societies, Official Language, Public services, Tribunals, Rights and Liabilities of the Government, Authoritative text of the Constitution in Hindi Language, Special Provision relating to certain classes.

Course Outcomes: Upon the completion of this, the students will able to know:

1. About the constitutional framework.
2. About the government system
3. Various type of government
4. About Constitutional bodies: Election commission, UPSC, SPSC, Commission for ST/SC and many others.
5. Non-constitutional bodies: Planning Commission, NDC, NHRC, SHRC, CBI, Vigilance Commission and other dimensions of constitution.

Books Recommended:

1. **M.P. Jain**, Indian Constitutional Law, 7th Edition
2. **B. K. Sharma**, Introduction to the Constitution of India, PHI

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester II

Course Title: Communication Skills Lab **Max. Marks: 50, Credits: 01[0-0-2]**
Course Code: HSMC-CSE-231 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objective: The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.
The following course content is prescribed for the English Language Laboratory sessions:

List of Experiments:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Lab. Outcomes: Upon the completion of the lab, the students will be able to:

1. Developing intellectual, personal and professional abilities.
2. On completion of the course, the students will be accurate in communication.
3. The students will be able to communicate effectively on complex engineering activities with the engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester II

Course Title: Basic Electronics Lab **Max. Marks: 50, Credits: 01[0-0-2]**

Course Code: ESC-CSE-231 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with basic electronic devices, their applications and characteristics.

List of Experiments:

1. To plot the Resonance curve for a series & parallel resonance.
2. To determine and plot operating characteristics of a PN junction diode
3. To study the input / output waveforms of Half wave and bridge wave rectifiers
4. To suppress the ripple in rectifiers using RC filters.
5. To study the clipper and clamper circuits.
6. To study the Zener characteristics and its application as voltage regulator
7. To plot characteristics of transistor in CE/CB configuration
8. To plot characteristics of a BJT.
9. To plot MOSFET characteristics.
10. To study frequency response of RC Coupled Oscillators.

Lab. Outcomes: Upon the completion of course, the students will be able to:

1. Determine the characteristics of PN Junction and Zener diode.
2. Design various rectifiers configuration and evaluate its various performance parameters.
3. Design and analyze various wave shaping circuits.
4. Determine the characteristics of a BJT and MOSFET
5. Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester II

Course Title: Engineering Mechanics Lab **Maximum Marks: 50, Credits: 01[0-0-2]**
Course Code: ESC-CSE-232 **University Examination:25**
Duration of Exam: 2 hours **Internal Assessment:25**

Lab. Objectives: The objective of the Engineering mechanics Lab is to perform experiments which are related to Statics and Dynamics Loading in order to understand the behavior of different mechanical equipment's which students study in theory.

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwell hardness testing machine.
5. To very Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Lab Course Outcomes: After the completion of lab course students will be-

1. Able to understand different engineering mechanics apparatus.
2. Able to understand the mechanical properties of materials.
3. Able to understand the moment of inertia of various shapes.
4. Get the practical idea of frictional forces.
5. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester II

Course Title: C-Programming Lab | **Maximum Marks: 50, Credits: 01[0-0-2]**
Course Code: ESC-CSE-233 | **University Examination:25**
Duration of Exam: 2 hours | **Internal Assessment:25**

Lab. Objectives: The course is designed to provide practical foundation for computer programming and to familiarize students with error handlings in programming.

List of Experiments:

1. Familiarization with programming environment.
2. Basic programs in Sequential Statement in C
3. Simple computational problems using arithmetic expressions.
4. Problems involving if-then-else structures.
5. Iterative/looping problems e.g., sum of series.
6. Performing operations on 1D Array.
7. Performing operations on 2D Array.
8. Performing operations on String.
9. Programs on Function declaration, definition and calling.
10. Implementation of Mathematical function
11. Programming for solving Numerical methods problems.
12. Programs on Recursive functions.
13. Programs on Pointers and structures.
14. Programs on File operations.

Lab. Outcomes

1. To be able to correct syntax and logical errors as reported by the compilers and run time for basic programs.
2. To be able to write iterative as well as recursive programs using functions as well
3. To be able to represent data in arrays, strings and structures and manipulate through a program
4. To be able to declare pointers of different types and use them in defining self-referential structures.
5. To be able to create, read and write to and from simple text files.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester II

Course Title: Workshop Practice **Max Marks: 50, Credits: 02[0-0-4]**
Course Code: ESC-CSE-234 **Internal Assessment:50**
Duration of Exam: 2 hours

Detailed contents:

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods
2. Fitting operations & power tools
3. Electrical & Electronics
4. Carpentry
5. Plastic molding, glass cutting
6. Metal casting
7. Welding (arc welding & gas welding), brazing

Course Outcomes: Upon completion of this course, the students will:

1. Gain knowledge of the different manufacturing processes which are commonly employed in the industry,
2. Be able to fabricate components using different materials.

TEXT BOOKS:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., ―Elements of Workshop Technology‖, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Kalpakjian S. And Steven S. Schmid, ―Manufacturing Engineering and Technology, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, Manufacturing Technology – I‖ Pearson Education, 2008.
4. Roy A. Lindberg, Processes and Materials of Manufacture‖, 4th edition, Prentice Hall India, 1998.
5. Rao P.N., Manufacturing Technology, Vol. I and Vol. II, Tata McGrawHill House,

Workshop Practice:

1. Machine shop
2. Fitting shop
3. Carpentry
4. Welding shop
5. Smithy

Lab. Outcomes: Upon completion of this laboratory course, the students will be able to:

1. Fabricate components with their own hands.
2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. Assemble different components and produce small devices of their interest.

Note: Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Semester III

Course Title: Mathematics-III **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: BSC-CSE-321 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this course is to familiarize the prospective engineers with standard concepts and techniques in continuous transform, discrete transform and statistical techniques that will serve them well in tackling the various problems in the discipline.

Unit-I

Integral Transform-I: Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integral-differential equations.

Unit-II

Integral Transform-II: Fourier integral, Fourier Sine and Cosine integrals, Complexform of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

Unit-III

Z-Transform: Introduction and definition of z-transform, some standard forms, Linearity property, Damping rule Some standard results, shifting un to the right and to the left, Multiplication by n.Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

Unit-IV

Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables,

Unit-V

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares-fitting of straight lines, second degree parabolas.

Course Outcomes: After the completion of this course, the students will be able to:

1. Understand the basic concepts and techniques to solve Laplace transform and also learn to apply the same to solve various problems of engineering which are modeled through differential equations
2. Demonstrate the ability to understand the basic concepts and techniques to solve Fourier's transform and also learn to apply the same to find solutions of boundary value problems (BVP).
3. Apply the concepts of the z-transform in solving difference equations and other discreet signal system.
4. Learn the ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
5. Understand the basic ideas of statistics including measures of central tendency, correlation and regression and apply various statistical methods in engineering problems.

Text Books:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **Ross, A:** First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. **Ramana B.V.,** Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010
4. **Veerarajan T.,** Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2010.
5. **W. Feller,**An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
6. **David A. Santos,** Probability: An Introduction, Jones & Bratlett

Note for Paper Setter:-The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester III

Course Title: Data Structures Using C **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-321 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea for Hash Function, Separate Chaining, Open Addressing, Linear Probing.

Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

Unit-III

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures.

Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.

Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-IV

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

Unit-V

Graphs: Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms: Dijkstra`s Algorithm and Warshall`s Algorithm, Minimum Spanning Tree, Kruskal`s Algorithm and Prim`s Algorithm.

Course outcomes: At the end of this course, the student will able to do the following:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books:

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.

Reference Books:

1. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
2. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester III

Course Title: Object Oriented Programming Using C++ **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-322 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, and an appropriate framework for automated unit and integration tests.

Unit-I

Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm, Basic concepts of OOP's, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of procedural and object-oriented programming languages.

Unit-II

Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.

Unit-III

Classes and Objects: Structure and Class, Classes and objects, access specifies in C++, Inline Functions, Friend Functions, Constructors, and Destructors.

Polymorphism: Function Overloading, Operator Overloading, Virtual functions, Type Conversions in C++. Dynamic memory allocation in C++.

Unit-IV

Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi-level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding.

Generic programming with templates: Class templates, Function Templates, overloading template function, templates as member function of a class.

Unit-V

Exception Handling and Files: Exception handling overview, exception handling mechanism, throwing, and catching mechanism, multiple catch, catch all exceptions, rethrowing an exception.

Streams and Files: C++ Streams, Unformatted I/O operations, Formatted Console I/O operations, Opening and closing a file, File Pointers and their Manipulations, Sequential Input and Output Operations, Command Line Arguments.

Course Outcomes: At the end of this course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.
5. Must be able to understand and use Exception handling.

Text Books:

1. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.
2. **Balagurusamy E**, Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. **Bjarne Strustrup**, The C++ programming Language, Addison Wesley.
2. **Booch**, Object Oriented Analysis and Design with Applications, Addison Wesley.
3. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

Semester III

Course Title: Software Engineering **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE-323 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The program's goal is to provide a professionally guided education in software engineering that prepares graduates to transition into a broad range of career options: industry, government, computing graduate program, and professional education.

Unit-1

Introduction to Software: Definitions to know the meaning of Software Engineering .Need to discuss Importance of software engineering , The Software evolution, Software characteristic, Goals of Software Engineering, Software development life-cycle: Requirement analysis, software design, coding, testing and maintenance.

Unit-II

Software Models and Software requirement Specification: Water fall Model: Introduction, Diagram, Characteristics, Strengths. Weakness Prototyping model: Diagram, Characteristics, and Strengths Weakness. Iterative development model: Diagram, Characteristics, Strengths, Weakness. Spiral model: Diagram, Characteristics, Strengths, Weakness.

Types of requirements, functional and non-functional requirements, requirement engineering, requirement engineering process. Requirements elicitation, Requirement Validation, SRS Document – Goals, properties and characteristics of SRS documents,

Unit-III

System Design :What is software design, Importance of design, objective of design and comparison of good and bad design, Design framework ,Problem partitioning, Abstraction, Top down and Bottom up – design, Cohesiveness, coupling

Unit-IV

Coding: Top-down and bottom-up, structure programming, information hiding, and programming style.

Testing: levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, Software testing strategies, Verification and validation, Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta

Unit-V

Software Maintenance: Software maintenance definitions, need for software maintenance, categories of maintenance, software maintenance process models, techniques for reducing need of software maintenance.

Course Outcomes: At the end of this course, the students will able to,

1. Learn about the phases in software development cycle
2. To understand various types of models and requirements engineering
3. To understand the design principles.
4. Learn about the levels of testing and testing approaches
5. Learn about the maintenance model.

Text Books:

1. **Peters**, Software Engineering, Wiley India.
2. **Pankaj Jalote**, An integrated Approach to Software Engineering, Narosa Publishing.

Reference Books:

1. **Thompson**, Software Engineering Project management, Wiley India.
2. **Richard Fairley**, Software Engineering, TMH.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester III

Course Title: Operating System **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE-324 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment:40**

Course Objectives:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

Unit-1

Introduction: Introduction to Operating System, History of Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods. Operating System Structure: System Components, System Structure.

Unit-II

Process Management: Process concept, Process states, Principle of Concurrency, Semaphores and its types. Process Scheduling, Process Synchronization, Classical problems in Concurrency, Producer Consumer, Critical Section and readers writers problem, Producer Consumer Problem, Inter Process Communication, Process Generation, Resident Monitors.

Unit-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithms, Multiprocessor Scheduling.

Deadlock: System Model, Shared resource, Resource allocation and Scheduling, Resource allocation graph, Deadlock Characterization, Prevention, Detection and Recovery.

Unit-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Unit-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISKI/O, Disk Scheduling algorithms and Operating System Design Issues.

File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing. Unix and Linux Operating System as case studies, Time OS and Mobile OS.

COURSE OUTCOMES: At the end of this course, the students will be able to do the following:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement a file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

Text Books:

1. **Milenekovic**, Operating System Concepts, McGraw Hill
2. **Silverschwatz,** Operating System Concepts, Willey & Willey.

Reference Books:

1. **Dietel,** An introduction to operating system, Addision Wesley.
2. **Tannenbaum A. S.,** Operating system design and implementation, PHI

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester III

Course Title: Digital Logic Design **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC- CSE-325 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit-I

Introduction, Binary numbers, Base-conversions, Octal and hexadecimal numbers, Binary codes, Concept of fixed and floating point numbers, Complement Number Representation,
Addition, Subtraction, Multiplication, and Division. Review of Boolean algebra, De-Morgan's Theorems, Boolean functions and representation in canonical and standard forms, SOP and POS forms.

Unit-II

Digital Logic Gates,IC Digital Logic Families, Karnaugh Map Method: 3 variable , 4 variable, 5 variable Map, limitations of K-maps for larger variables, POS-simplification, NAND/NOR implementation, other 2-level implementations, Don't-care conditions, Tabular method.

Unit-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

Unit-IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit-V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

Course Outcomes: After studying this course the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. Ability to identify basic requirements for a design application and propose a cost effective solution.
4. The ability to identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build, and troubleshoot digital circuits.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.

References Books:

1. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4thEdition 1997.
2. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester-III

Course Title: Data Structures Using C Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-331 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Programs:

1. Program to demonstrate concept of structures.
2. Program to implement single Linked List.
3. Program to implement Doubly Linked List.
4. Program to implement Stack using Linked List.
5. Program to implement Queue using Linked List.
6. Program to implement Stack using arrays.
7. Program to implement Queue using arrays.
8. Program to Create and Copy a Tree.
9. Program to implement Tree Traversal.
10. Program to implement Insert and Delete Operation on Trees.
11. Program to implement AVL Trees.
12. Program to implement Warshal`s algorithm to find path matrix.
13. Program to implement Djikstra`s algorithm.
14. Program to implement Binary Search.
15. Program to implement Bubble, Selection, Insertion, Heap, Merge and Quick Sort.

Course Outcomes:

1. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
2. Understand basic data structures such as arrays, linked lists, stacks and queues. Describe the hash function and concepts of collision and its resolution methods
3. Solve problem involving graphs, trees and heaps
4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Note: This is only the suggested list of practical exercises. Instructor may add or change some practical's relevant to the course contents.

Semester III

Course Title: Object Oriented Programming Using C^{++} Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-332 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Program to break a number into its factors
2. Program to generate prime series from 1 to 100.
3. [Classes and Objects] Program to demonstrate the use of static data members.
4. [Classes and Objects] Program to demonstrate the use of friendly functions.
5. [Constructors and Destructors] Program to demonstrate the use of zero argument and parameterized constructors.
6. [Constructors and Destructors] Program to demonstrate the use of multiple constructors in a class (Overloaded constructors).
7. [Operator Overloading] Program to demonstrate the overloading of unary operators.
8. [Operator Overloading] Program to demonstrate the overloading of binary arithmetic operators.
9. [Operator Overloading] Program to demonstrate the overloading of binary arithmetic operators using friend function.
10. [Typecasting] Program to demonstrate the typecasting of basic type to class type.
11. [Typecasting] Program to demonstrate the typecasting of class type to class type.
12. [Inheritance] Program to demonstrate the multilevel inheritance.
13. [Inheritance] Program to demonstrate the multiple inheritance.
14. [Inheritance] Program to demonstrate the virtual derivation of a class.
15. [Polymorphism] Program to demonstrate the runtime polymorphism.
16. [Exception Handling] Program to demonstrate the exception handling.
17. [Templates and Generic Programming] Program to demonstrate the use of function template.
18. [Templates and Generic Programming] Program to demonstrate the use of class template.
19. [File Handling] Program to copy the contents of a file to another file byte by byte. The name of the source file and destination file should be taken as command-line arguments,
20. [File Handling] Program to demonstrate the reading and writing of objects.

Course Outcomes:

At the end of this course, the student will able to do the following:

1. Understanding and implementation of various object oriented programming concepts like inheritance, polymorphism, object and classes etc.
2. Designing the application using the object oriented concepts

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-III

Course Title: Digital Logic Design Lab **Max Marks: 50,Credits: 01[0-0-2]**
Course Code: PCC-CSE-333 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Study of pin diagram of various ICs and to test the logic gates and verify their truth tables.
2. Implementation of following with Logic Gates.
    1. Half Adder.
    2. Full Adder.
    3. Half Subtractor.
    4. Full Subtractor.
3. Implementation of Boolean functions using 74153 4:1 MUX
4. Implementation of De-multiplexer, Decoder and Encoder.
5. To add two 4 bit binary numbers using IC 7483.
6. To verify the operation of all flip-flops.
7. To design and implement 2-Bit counter.
8. To verify the operation of different modes of shift register using IC 7495.
9. Design of BCD to 7 segment display using logical gates.
10. Simulations
    10.1 Introduction to circuit maker and electronic work bench.
    10.2 Implementation of experiments from Serial No. 1 to 8 through simulations.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Design and implementation of combinational circuits like adder, subtractor, encoder and decoder, multiplexer and De-multiplexer etc.
2. Able to simulate various circuit designs through circuit maker and electronics workbench or any other tools.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester IV

Course Title: Discrete Mathematics **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-421 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The Course is designed to impart knowledge of Set theory, Logic and Graph theory and their applications to prospective engineering students.

Unit-I

Set Theory and Functions: Basic concepts, Venn diagram, Set Operations, principle of Inclusion and Exclusion, Relation types of relations, properties of relation, Function: definition and notation, one to one, onto, one to one and onto, composition of functions.

Unit-II

Logic: Propositional Calculus-Statements and Notations, Logical operators, Connectives and Truth tables, Bi-conditional statements, Tautologies, Duality Law.

Unit –III

Graphs: Definitions and examples of graphs Incidence and degree, Handshaking lemma, Isomorphism Sub-graphs, Weighted Graphs, Eulerian Graphs, Hamiltonian Graphs Walks, Paths and Circuits, Shortest Path Algorithm, Fleury's and Dijsktra's Algorithm, Chinese Postman problem.

Unit-IV

Trees: Definition and properties of trees Pendent vertices centre of a tree Rooted and binary tree, spanning trees, minimal spanning tree, Prim's and Kruskal's Algorithms' for minimal cost spanning tree.

Unit-V

Planar Graphs & Matrix Representation of Graphs: Definition of planar graph, Euler's theorem for planar graph, Kuratowski's graphs, Incidence, Adjacency Matrices and their properties.

Course Outcomes: After the completion of this course, the students will be able to:

1. Understand basic concept of functions and relations
2. Understand and use argument, evaluation, analysis, logic and truth tables.
3. Comprehend the basic terminology and analyse applications of graph theory in modern society.
4. Learn to model problems using graphs and understand some basic algorithms to solve these real world problems.
5. Understand relation between matrix theory and graph theory.

Text Books:

1. **Kolman, Busby & Ross,** "Discrete Mathematical Structures". Prentice Hall 6th edition.
2. **S. Santha,** "Discrete Mathematics with Combinatorics and Graph theory". Cengage Learning.

Reference Books:

1. **Kenneth H Rosen,** "Discrete Mathematics and its applications with Combinatorics and Graph Theory", McGraw Hill
2. **Graham, R. M., D. E., Knuth & O. Patashnik** [1989], Concrete Mathematics, A Foundation for Computer Sciences, Addison Wesley

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Python Programming **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE–422 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: Python is a modern language useful for writing compact code specifically for Programming in Server-Side web Development, AI, data analytics and Game Programming. This course covers the basics and advanced python programming to harness its potential for modern computing requirements

Unit-I

Introduction to Python: Introduction to Python, History, Installation and Working, Understanding variables, basic operators, and blocks. Declaring and using Numeric and string data type, defining list and list slicing, Use of Tuple data type, working with sequence. Flow Control: Conditional blocks using if, else and else if, loops in python for loop, while loops in python, Loop manipulation using pass, continue, break and else Programming.

Unit-II

Python Functions, Modules and Packages: Organizing python codes using functions, modules. Importing own module as well as external modules, Understanding Packages, Powerful Lamda function. Python String, List, tuple, set and Dictionary Manipulations:

Unit-III

Python Object Oriented Programming –Concept of class, object and instances, Constructor, class attributes and destructors, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support. Multithreading: Understanding threads, forking threads, synchronizing the threads, Programming using multithreading. Working with System (sys Module), Working with Operating System (os module).

Unit-IV

Python File Operation: Reading and Writing files in python, read functions and write functions, manipulating file pointer using seek, Programming using file operations. Python Regular Expression: pattern matching and searching using regex in python, Real time parsing of networking or system data using regex, Password, email, URL validation using regular expression

Unit-V

Python Exception Handling: Avoiding code break using exception handling, Handling and helping developer with error code, Built-in exception. Database Interaction**:** SQL Database connection using python, Creating and searching tables, Reading and storing config information on database, Programming using database connections

Course Outcomes: At the end of this course, the students will able to do the following:

1. To understand data and the operations that can be applied to each data type
2. To write programs that get input, perform calculations, and provide output
3. To understand the OOPs concepts with respect to fourth generation language
4. To write well designed and well documented programs that is easily maintainable.
5. To test and debug programs (find out what is wrong and fix it)**.**

Text Books:

1. **R. Nageswara Rao**, "Core Python Programming", Dreamtech.
2. **Wesley J. Chun.,** "Core Python Programming", -2nd Edition Prentice Hall.
3. **Kenneth A. Lambert**, "The Fundamentals of Python: First Programs", 2011, Cengage Learning,

Refercence Books:

1. **Luke Sneeringer,** "Professional Python", Wrox.
2. **John V Gutttag.,** "Introduction to Computation and Programming using Python", PHI.
3. **Allen B. Downey,** "Think Python", Green Tea Press, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Computer Organization & Architecture **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-423 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism, micro programming and advanced pipelining techniques.

Unit-I

Fundamentals of a Computer System: Functional Units of a Digital Computer, Hardware, Software Interface, Translation from a High Level Language to the Hardware Language, Instruction Set Architecture Styles and features RISC and CISC Architectures, Performance Metrics, Amdahl's Law, Case Studies of ISA

Unit-II

Arithmetic for Computers: Integer Addition and Subtraction, Fast Adders, Multiplication, Booths multiplication algorithm, Division, Floating Point Numbers Representation, IEEE 754 single and double precision formats, floating point arithmetic.

Unit-III

Basic Processing Unit: Components of the Processor, Data path and Control, Execution of a Complete Instruction, Hardwired and Micro programmed Control, Instruction Level Parallelism, Basic Concepts of Pipelining, Pipelined Implementation of Data path and Control – Hazards – Structural, Data and Control Hazards –Exception handling

Unit-IV

Advanced Concepts in ILP and Current Trends: Exploitation of more ILP, Hardware and Software Approaches, Dynamic Scheduling, Speculation, Compiler Approaches, Multiple Issue Processors, ILP and Thread Level Parallelism, Current Trends, Multicore Processors

Unit-V

Memory and I/O: Need for a hierarchical memory system, Types and characteristics of memories, Cache memories –Improving cache performance – Virtual memory – Memory Management techniques – Associative memories.

Course Outcomes:

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

Text Books:

1. **David A. Patterson and John L. Hennessy,** "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by Elsevier.
2. **Carl Hamacher** "Computer Organization and Embedded Systems", 6th Edition by McGraw Hill Higher Education.

Reference Books:

1. **John P. Hayes**, "Computer Architecture and Organization", 3rd Edition by WCB/McGraw-Hill
2. **William Stallings**, "Computer Organization and Architecture: Designing for Performance", 10th Edition by Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Database Management System **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-424 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The main objective of this course is to introduce the basic concepts of database, data modeling techniques using entity relationship diagram, relational algebra and calculus, basic and advanced features SQL, normalization, transaction processing, concurrency control, and recovery techniques.

Unit-I

Introduction: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, Structure of DBMS.

Data Modelling using Entity Relationship Model: ER Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Extended ER model concepts.

Relational Model: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity,

Unit-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple Calculus - Domain calculus.

Introduction to SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Sub queries, Aggregate and Scalar Functions, Triggers.

Unit-III

Normalization – Functional Dependencies, Armstrong's axioms for FD's, Normal Forms: First, Second, Third Normal forms, BCNF, Properties of Decompositions, Multivalued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal form, Inclusion Dependencies.

Unit-IV

Transaction & Concurrency Control: Transaction Concept, Transaction State, ACID properties. Schedules, Serializability, Testing of Serializability, Recoverability. Recovery from Transaction Failures, Log Based Recovery, Checkpointing, Shadow Paging.

Concurrency Control: Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

Unit-V

Implementation Techniques:Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

Course Outcomes:

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.

Text Books:

1. **A. Silberschatz, Henry F. Korth, S. Sudarshan**, Database System Concepts, 6th Ed. McGraw-Hill.
2. **J. D. Ullman**,Principles of Database and Knowledge – Base Systems, Computer Science Press.

Reference Books:

1. **R. Elmasri and S. Navathe**,Fundamentals of Database Systems , 5th Ed., Pearson Education
2. **Serge Abiteboul, Richard Hull, Victor Vianu,** Foundations of Databases, Addison-Wesley

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Semester IV

Course Title: Unix/Linux & Shell Programming **Max Marks: 100, Credits: 03, [3-0-0]**
Course Code: PCC-CSE-425 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, overview of the concept of buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipesystem call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes: process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control: process creation, signals, process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter Process communication, process tracing, network communication, sockets, Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Understanding the concept of shell programming
2. Understanding the working of kernel and implementing them.
3. Implementing the system calls, process management, and inter process communication
4. Understand Shell Programming and its implementation.
5. Understanding Semaphores along with interprocess communication.

Text Books:

1. **Maurice J Bach.,** The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S. Eric**, The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,** Advanced Unix Programming.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Management Information Systems **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: HSMC-CSE- 421 **University Exams: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this subject is to understand the concept of MIS in terms of its various components and as an integrated system.

Unit-I

Introduction: Definition and Importance of MIS, Evolution of MIS, Concept of MIS, Function of MIS, Characteristics of MIS, Managerial Functions, Management Hierarchy, System: Elements of a system, Cybernetic System.

Unit-II

Structure of MIS:MIS structure based on Operating Elements, MIS structure based on Decision Support, MIS structure based on Management Activities, MIS structure based on Organizational Function, Synthesis of MIS Structure: Conceptual and Physical Structure.

Unit-III

Classification of MIS & Information Concept: MIS Classification: Operation Support System, Management Support System and Other Support System. Data and Information, Characteristics of Information, Quality of Information, Classification of Information: John Dearden Classification, Classification in terms of Application and Classification on the basis of usage. Methods of Data and Information Collection, Methods to Avoid misuse of Information.

Unit-IV

Decision-Making and DSS: Types of Decisions: Purpose of Decision Making, Level of programmability, Knowledge of outcomes. Decision Making Models: Simon's Model of Decision Making and Implicit Favorite Model. Decision Support System: Elements of DSS, Objective of DSS, Characteristics of DSS, Classification of DSS.

Unit-V

Enterprise Resource Planning: Introduction, Main Features of ERP, Evolution of ERP, General Model of ERP, Benefits of ERP, Role of Consultants ,Vendors and Users in ERP,ERP Implementation Methodology.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Understand the concept and function of MIS.
2. Understand the structure of MIS.
3. Understand the methods of data and information collections, Characteristics of Information and its qualities
4. Understand the decision making models and DSS
5. Understand the ERP model and its implementation steps.

Text Books:

1. **D. P. Goyal**, MIS**,** Macmillan Publishers.
2. **Davis and Olson**, MIS, TMH.

Reference Books:

1. **CSV Murthy**, MIS, Himalaya Publishing House.
2. **Vinod Kumar Garg**, ERP, PHI Learning Pvt. Ltd.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Python Programming Lab **Max Marks: 50,Credits: 01[0-0-2]**
Course Code: PCC-CSE-431 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Lab Objectives:

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

List of Programs:

1. Write a program to demonstrate different number datatypes in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and accessing substring from a string.
4. Write a python script to print the current date in following format
5. Write a python script to use string methods
6. Write a python program to create, append and remove lists in python.
7. Write a program to demonstrate working with tuples in python
8. Write a program to demonstrate working with dictionaries in python
9. Write a program to check whether a number is oven or odd using if condition
10. Write a program to demonstrate for loop
11. Write a program to demonstrate while loop
12. Write a program to display prime numbers between 50 to 60
13. Write a program to display Fibonacci series
14. Write a program to display Armstrong number
15. Write a program to display address of variables
16. Write a program to implement Function in python
17. Function call with tuple and dictionary
18. Write a program to implement modules
19. Write a program to implement ladders and snake game
20. Write a program to implement dir function in modules
21. Write a program to explore math module
22. Write a program to explore datetime module
23. Write a program to explore lambda functions
24. Write a program to implement linear search

COURSE OUTCOME: Upon completion of the course, students will be able to:

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester IV

Course Title: Database Management System Lab. **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-432 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario. Two assignments shall be carried out i.e. consider two different scenarios (e.g. bank, college)
2. Creating Database: Viewing all databases, creating a Database, Viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback).
3. Table and Record Handling: INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements.
4. Retrieving Data from a Database: The SELECT statement, Using the WHERE clause, Using Logical Operators in the WHERE clause, Using IN, BETWEEN, LIKE, ORDER BY.
5. Write SQL queries equivalent to relational algebra queries for a given set of relations.
6. Perform the following:
   Altering a Table, Dropping/Truncating/Modifying/Renaming Tables, Backing up / Restoring a Database.
7. For a given set of relation schemes, create tables and perform the following:
   Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (GROUP BY and HAVING Clause), Queries involving- Date Functions, String Functions, Math Functions.
8. Join Queries- Inner Join, Outer Join, Subqueries- With IN clause, With EXISTS clause
9. For a given set of relation tables perform the following:
   Creating Views (with and without check option), Dropping views, Selecting from a view.
10. Write a query to understand the concepts for ROLL BACK, COMMIT & SAVEPOINTS.
11. Database Management: Creating Column Aliases, Creating Database Users, Using GRANT, and REVOKE.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Understand the basis of SQL and PL/SQL.
2. Design and implementation of database for an application

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester IV

Course Title: Unix/Linux & Shell Programming Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-433 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Lab Objective: The lab course will address the demand for Information technology professionals with UNIX training and experience.

List of Experiments:

1. Using the visual editor (vi) and the Pico editor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administration issues.
8. Practicing various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web server configuration.

Lab Outcomes: Upon completion of this course, the student will be able to:

1. Run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. Run C / C++ programs on UNIX.
3. Do shell programming on UNIX OS.
4. Understand and handle UNIX system calls.

Note: This is only the suggested list of experiments. Instructor may frame additional experiments relevant to the course contents

Semester V

Course Title: Theory of Automata **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE–521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of abstract models of computation.

Unit-I

Introduction: Alphabets, Strings and Languages; Automata and Grammars.

Machines: Basic Machine, FSM, Transition Graph, Transition Matrix, Deterministic and Non-Deterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore Machines, Minimization of Finite Automata, Two-Way Finite Automata.

Unit-II

Regular Sets and Regular Grammars: Regular Sets, Finite Automata and Regular Expression, Pumping Lemma and Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets.

Formal Grammars & Languages: Basic Definitions and Examples of Languages, Chomsky Hierarchy, Regular Grammars, Context Free & Context Sensitive Grammars, Normal Forms -CNF and GNF.

Unit-III

Pushdown Automata: Formal Definition, Behaviour and Graphical Notation, Instantaneous Descriptions and Language of PDA. Equivalence of PDAS and CFGS.

Linear Bounded Automata: Context Sensitive Language and Linear Bounded Automata

Unit-IV

Turing Machines: TM Model, Representation and Languages, Acceptability of TM. Design of TM, Church-Turing Thesis, Universal Turing Machine & Other Modification, Composite & Iterated TM.

Unit-V

Computability: Basic concepts, Recursion, Partial, Total Recursive and Primitive Recursive Functions, Decidability.

Undecidability: Turing Machine Languages, Properties of recursive & recursively enumerable languages, Universal Turing machine and undecidable problem, Halting Problem, Post Correspondence Problem, Rice's theorem.

Course Outcomes:

1. Write a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language and for a given language determine whether the given language is regular or not. Design context free grammars to generate strings of context free language
3. Determine equivalence of languages accepted by Push down Automata and languages generated by context free grammars.
4. Write the hierarchy of formal languages, grammars and machines. Also Design of Turing Machine.
5. Distinguish between computability and non-computability and Decidability and undecidability

Text Books:

1. **J Hopcroft, JD Ullman, R Motwani**, Introduction to Automata Theory, Languages and Computation, 3rd Ed., Pearson, 2008
2. **Michael Sipser**, Introduction to Theory of Computation, 3rd Edition, Course Technology, 2012
3. **Xavier S. P. E**., Theory of Automata and Formal Languages, New Age Intl.2005 Ed.

Reference Book:

1. **E. V. Krishnamurthy**, Introductory Theory of computer science.
2. **K. L. P. Mishra**, Theory of computer Science, Prentice Hall of India Pvt. Ltd.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Computer Networks **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE-522 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To provide insight about fundamental concepts and reference models (OSI and TCP/IP) and its functionalists.
2. To gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP.
3. To know the implementation of various protocols

Unit- I

Introduction: Basic communication model, Introduction to data communication, components of data communication system, data flow(simplex, half –duplex and full duplex), data transmission (parallel transmission ,serial transmission),introduction to computer network, components of computer network, advantages and disadvantages of computer networks, network criteria, network topology, OSI &TCP-IP.

Physical Layer: Functions of Physical Layer. Classification of transmission medium.

Unit-II

Data Link Layer and Medium Access Sub Layer: Functions of Data link Layer, Error Detection and Error Correction (type of errors, Redundancy, coding) parity checking ,CRC, Flow Control and Error control protocols, Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window Piggybacking, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA.

Unit-III

Network Layer: Functions of Network Layer, Packet Switching and Datagram approach, IP addressing methods, IPV4, IPV6, transition from IPv4 to IPv6 (Dual stack and tunneling) Sub netting, Delivery(direct ,indirect), Forwarding (forwarding techniques)Routing protocols(RIP,OSPF,BGP) ,unicast, multicast and broadcast routing Bellman ford and Dijkstra algorithm, ARP, RARP, BOOTP and DHCP.

Unit-IV

Transport Layer: Functions of Transport Layer, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion control, Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

Unit-V

Application Layer: Domain Name Space (DNS), TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, Bluetooth, Firewalls, Basic concepts of Cryptography.

Course Outcomes:

1. Explain the functions of the different layer of the OSI Protocol.
2. Able to understand the two main functions of Data link layer i.e data link control and media access control
3. Able to understand the delivery, forwarding and routing of packets.
4. Understand the difference between process to process, host to host and node to node communication.
5. Able to understand what services are provided by the application layer to the user.

Text Books:

1. **Behrouz A. Forouzan**, Data Communication and Networking, 4th Edition, McGrawHill.
2. **William Stallings**, Data and Computer Communication, 8th Edition, Pearson Prentice Hall India.

Reference Book:

1. **Andrew S. Tanenbaum,** Computer Networks, 8th Edition, Pearson New International Edition.
2. **Douglas Comer,** Internet working with TCP/IP, Volume 1, 6th Edition Prentice Hall of India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

Semester V

Course Title: Java Programming **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE-523 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance skills of student with the ever demanding programming language Core Java.

Unit-I

Overview of JAVA: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Byte code, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

Unit-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

Unit-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

Unit-IV

I/O, Applets and String Handing Files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, Print Writer Class, Reading and Writing Files, Transient And Volatile Modifiers, Instance Of, Strictfp, Native Methods. Applets: Introduction: Applet Fundamentals, Applet Architecture. Strings: String Constructors, String Operations, String Buffer, String Builder, Sting Tokenizer.

Unit-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Course Outcomes: At the end of the course, the student will be able to:

1. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
2. Write Java application programs using OOP principles and proper program structuring.
3. Demonstrate the concepts of polymorphism and inheritance.
4. Write Java programs to implement error handling techniques using exception handling.
5. Use collections Framework to solve problems

Text Books:

1. **P. Naughton& H. Schildt**, Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2. **K. Arnold & J. Gosling**, the Java Programming Language, 2nd Edn, Addison Wesley, 1996.

Reference Books:

1. **Cay S. Horstmann, Gary Cornell**, Core Java 2 Volume I Fundamentals, 5th Edn. PHI, 4000.
2. **R. Nageswara Rao**, Core Java: An Integrated Approach: Covers Concepts, programs and Interview Questions.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Microprocessors and Interfacing **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE-524 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of 8085 and 8086 microprocessors and their interfacing.

Unit-I

Introduction to 8085: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

8085 Assembly Language Programming and Interrupts: Assembly language programming in 8085, Microprocessor timings, Machine cycles, T states, Timing diagram for different machine cycles. Interrupts in 8085, RST instructions, multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts

Unit-III

8085 Interfacing: Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA Controller. Interfacing of keyboard, LED and seven segment displays with 8085.

Unit-IV

8086 Microprocessor: Overview of 8086 features, architecture of 8086: execution unit and bus interface unit, flags and general purpose register, 8086 pin diagram, Memory segmentation, Minimum and Maximum mode operation, Addressing modes.

Unit-V

8086 Assembly Language Programming and Interrupts: 8086 instruction set, assembler directives, macros. Assembly language programming involving arithmetic, logical, branch & call instructions, string manipulations. 8086 interrupts.

Course Outcomes: After completion of the course student will be able to:

1 Describe the various architectural aspects of 8085 Microprocessor.
2 Understand the interrupt phenomenon, timing diagram and write basic assembly language programming in 8085
3 Elaborate the synchronous and asynchronous data transfer and Direct Memory Access in 8085 and interfacing of 8085 with external devices.
4 Describe the various architectural aspects of 8086 Microprocessor.
5 Understand the interrupt phenomenon and write basic assembly language programming in 8086

Text Books:

1. **R. S. Gaonkar**, Microprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.
2. **Douglas V Hall**, Microprocessors & Interfacing, TMH

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Professional Elective-I Courses

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-521	Data Warehousing and Data Mining	PEC –CSE-524	Mobile Computing
PEC –CSE-522	Cyber Crime and Laws	PEC –CSE-525	Visual Programming
PEC –CSE-523	Internet and Web Technology	PEC –CSE-526	Advance Data Structures

Semester V

Course Title: Data Warehousing and Data Mining **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply pre-processing methods on raw data.
3. Learning different classification algorithms for data mining.

Unit-I

Introduction: Sources, Users, Applications and Goals of a Data Warehouse, Components of a Data Warehouse, Operational Data Store, Dimensional Modeling: Fact and Dimension Tables, Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions, Helper Tables and Surrogate Keys.

Unit-II

Data Warehouse: Characteristics of a Data Warehouse, Software Architecture and Design, Data Granularity Model, Data Warehouse Bus Architecture. Meta Data: Need and Types of Metadata, Metadata Process Concept. Data Marts and its Characteristics, Comparison between OLTP and OLAP.

Unit-III

Decision Support System (DSS): Using Data Warehouse for DSS, Techniques and Solutions for constructing a Central Data Warehouse, Data Extraction, Cleanup, and Transformation Tools, Managing a Data Warehouse Environment.

Unit-IV

Data Mining: Introduction to Data Mining and Uses, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining Task Primitives.

Association Rules: Association rules mining, Mining Association rules from single level, multilevel transaction databases, multidimensional relational databases and data warehouses, Co-relational analysis, Constraint based association mining.

Unit-V

Classification and Clustering: Classification and prediction, decision tree induction, Bayesian classification, k-nearest neighbor classification, rule based classification, classification of back propagation, support vector machines, associative classification, cluster analysis, types of data in clustering, categorization of clustering methods, genetic algorithms and data visualization concepts.

Course Outcomes: Students who complete this course should be able to:

1. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
2. Describe the various architectures and main components of a data warehouse.
3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
4. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
5. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. **Gray & Smith**, Data Warehousing handbook, CRS, PHI.
2. **Berson**, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. **Mallach**, Data Warehousing System, McGraw Hill.
2. **Prabhu**, Data Warehousing–Concepts, Techniques, Products and Applications, 2nd Edn, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Semester V

Course Title: Cyber Crime and Laws **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-522 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: To maintain an appropriate level of awareness, knowledge and skill required to minimize the occurrence and severity of incidents related to cybercrimes, digital forensics and cyber law.

Unit-I

Introduction to Cyber law and Computer Forensics: What is Cyber Law, Need for Cyber Law, Indian Cyber Law, Information Technology Act, Relevant Cyber Crimes other than IT Act, 2000, what is computer Forensics, Objectives of computer Forensics, Computer Forensics Services, Steps Taken by Computer Forensics Specialists, Who can use Computer Forensic Evidence, Problems with Computer Forensic Evidence.

Unit-II

Cyber Crimes: Introduction to Cyber Crime, Defining Cyber Crime, Frequently Used Cyber Crimes, Reasons for Cyber Crime, Cyber Criminals, Mode and Methods of Committing Cyber Crimes, Motive Behind Any Attack, Classification of Cyber Crime.

Unit-III

Computer Investigation Process: The concept of cyber security, meaning, scope and the frame work, Collecting and preserving Evidence.

Unit-IV

Constitutional & Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace –Access to Internet, Right to Privacy, Right to Data Protection

Unit- V

Intellectual Property in Cyberspace

The Concept of Intellectual Property, The World Intellectual Property Organization (WIPO)-History and structure, Fields of Intellectual Property Protection-Patents, Copyright and Related Rights, Trademarks, Protection Against Unfair Competition

Course Outcomes: On successful completion of this course students will be able to

1. Understand basic concepts of cyber laws.
2. Understand the various types of cybercrime.
3. Understand the concept of cyber security and methods for Collecting and preserving Evidence.
4. Understand the definition of Freedom of Speech and Expression in Cyberspace
5. Understand the concept of Intellectual Property.

Text Books:

1. **Marie - Helen Maras, Jones & Bartlett Learn,** Computer Forensics: Cybercriminals, Laws, and Evidence, ,1st Edition ,2011
2. Computer Forensics: Investigating Network Intrusions and Cyber Crime, EC Council Press Series, Cengage Learning , 2010
3. **Stuart McClure, Joel SeatnbraV and George Kurtz**, Hacking Exposed: Network Security Secrets & Solutions, , McGraw-Hill, 2005

Reference Books:

1. **Justice Yatindra Singh**, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).
2. **Albert J. ,Marcella Jr** ,Cyber Forensics: from Data to Digital Evidence ,Wiley,1st Edition,2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Semester V

Course Title: Internet and Web Technology **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC- CSE-523 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this subject is to understand about Website Development and Internet.

Unit-I

Internet & HTML: History and growth of Internet, Introduction to WWW, HTTP, Web Architecture, Web Browsers and Search Engines, Static, Dynamic and active websites and their applications, web hosting. HTML: Introduction to HTML, Overview, Tags, Elements, Attributes, Heading, Paragraphs, Styles, Colours, Links, Images, Tables, frames and forms, Overview of DHTML.

Unit-II

Cascading Style Sheets (CSS): Text or font properties, background, border, margin, padding properties, Align, Navigation Bar, Drop downs, Image Gallery, page layout properties and user interface properties

Unit-III

JavaScript: Functions- Introduction, Program Modules in JavaScript, Programmer-Defined Functions, Function Definitions, Random-Number Generation, Example: Game of Chance, Duration of Identifiers, Scope Rules, JavaScript Global Functions, Recursion, Example Using Recursion: Fibonacci Series, Recursion vs. Iteration, JavaScript Internet and World Wide Web Resources. JavaScript arrays, JavaScript objects. Introduction to Angular and React JS.

Unit-IV

Extensible Markup Language (XML): Introduction, Structuring Data, XML Namespaces, Document Type Definitions (DTDs) and Schemas, Document Type Definitions, W3C XML Schema Documents, XML Vocabularies, Document Object Model (DOM), DOM Methods, Simple API for XML (SAX), Extensible Style sheet Language (XSL), Simple Object Access Protocol (SOAP), Internet and World Wide Web Resources,

Unit-V

Introduction to Server-Side Programming: Web Servers (IIS, PWS and Apache)- Introduction, HTTP Request Types, System Architecture, Client-Side Scripting versus Server-Side Scripting, PHP, Overview, variable, Control statements, Arrays, functions and forms, advanced PHP. MySQL Database Connectivity.

Course Outcome:

1. Develop simple static websites.
2. Static websites with CSS.
3. Dynamic websites using Java Scripting.
4. Develop XML parsers
5. Dynamic website with server-side scripting using PHP.

Text Books:

1. **Thomas Powell**, Complete Reference HTML/XHTML.
2. **S. Achyut Godbole and AtulKahate,** Web Technologies, Tata McGraw Hill.
3. **Raj Kamal**, Internet & Web Design, Tata McGraw Hill.

Reference Books:

1. **H.M.Deitel, P.J.Deitel and T.R.Nieto,** Internet and World Wide Web: How to Program,Pearson Education, 2000
2. **Xavier C.,** Web Technology & Design, New Age International Publishers.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Mobile Computing **Max Marks: 100,Credits: 03[3-0-0]**
Course Code: PEC-CSE-524 **University Exam: 60**
Duration of Exam: 3 hour **Internal Assessment: 40**

Course Objective: This course introduces the basic concepts and principles in mobile computing. This includes the major techniques involved, and cover mobile transport layer, data dissemination and database issues in mobile computing.

Unit-I

Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture. GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.(Wireless) Medium

Unit-II

Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near andfar terminals), SDMA, FDMA, TDMA, CDMA. Mobile Network Layer: Mobile IP (Goals, Assumptions, entities and terminology, IP packet delivery, agent advertisement anddiscovery, registration, tunneling and encapsulation, optimizations), Dynamic Host configuration Protocol (DHCP).

Unit-III

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP.

Unit-IV

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and Quality of service issues.

Unit-V

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, pushes based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques. Mobile Ad hoc Networks (MANETs): Wireless Application Protocol-WAP.

Course Outcome: On successful completion of this unit students will be able to:

1. Understand the concept of mobile computing, various security issues, protocols and handover method in mobile computing.
2. Grasp the concepts and features of SDMA, FDMA, TDMA, CDMA,DHCP
3. A good understanding of how the underlying wireless and mobile communication networks work, their technical features.
4. Grasp the concepts of hoarding techniques, caching invalidation mechanisms, client server computing with adaptation.
5. Identify the important issues of data dissemination

Text Books:

1. **Reza B'Far**, Mobile Computing Principles: Designing and developing Mobile applications with UML and XML, Cambridge University, 2004.
2. **RetoMeie,** Professional android Application development, Wrox Programmer to Programmer, Wrox, 2008.

Reference Books:

1. **Axel Kupper,** Location-Based Services: Fundamentals and Operation, Wiley, 2005
2. .**Raj Kamal,** Mobile Computing, Second Edition, Oxford higher Education.

Note for paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Semester V

Course Title: Visual Programming **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-525 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The student should be made to:

1. Understand the foundations of CLR execution
2. Learn the technologies of the .NET framework
3. Know the object oriented aspects of C#
4. Learn web based applications on .NET(ASP.NET)

Unit-I

Introduction to C#: Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

Unit-II

Object Oriented Aspects of C#: Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

Unit-III

Application Development on .NET 9: Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, Dataset, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

Unit-IV

Web Based Application Development on .NET 9: Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

Unit-V

CLR and .NET Framework 9: Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

Course Outcomes:

1. List the major elements of the .NET frame work
2. Explain how C# fits into the .NET platform.
3. Analyze the basic structure of a C# application
4. Debug, compile, and run a simple application.
5. Develop programs using C# on .NET

Text Books:

1. **Herbert Schildt**, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
2. **Christian Nagel et al**. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

References:

1. **Andrew Troelsen** , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
2. **Ian Griffiths, Matthew Adams, Jesse Liberty**, "Programming C# 4.0", 6th Ed., O"Reilly, 2010.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Advance Data Structures **Max. Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-526 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course is designed to impart advance knowledge of data structures.

Unit-I

Hashing – General Idea, Hash Function, Separate Chaining, Hash Tables without linked lists: Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Hash Tables in the Standard Library, Universal Hashing, Extendible Hashing.

Unit-II

Text Processing-String Operations, Brute-Force Pattern Matching, The naive string-matching algorithm, The Rabin-Karp algorithm, The Boyer- Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm.

Unit-III

Trees – AVL: Single Rotation, Double Rotation, B-Trees. Multi-way Search Trees – 2-3 Trees: Searching for an Element in a 2-3 Tree, Inserting a New Element in a 2-3 Tree, Deleting an Element from a 2-3 Tree. Red-Black Trees – Properties of red-black trees, Rotations, Insertion, Deletion.

Unit-IV

Skip Lists-Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists.

Disjoint Sets – Equivalence relation, Basic Data Structure, Simple Union and Find algorithms, Smart Union and Path compression algorithm.

Unit-V

Computational Geometry-One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quad trees, k-D Trees. Recent Trends in Hashing, Trees, and various computational geometry methods for efficiently solving the new evolving problem.

Course Outcomes:

1. Apply Hashing, Disjoint sets techniques for solving problems effectively
2. Learning and understanding text processing using data structure.
3. Apply the concepts of advanced Trees for solving problems effectively.
4. Apply the concepts of advanced skip list for solving problems effectively and understanding sets and various algorithms regarding set.
5. Understanding Computational Geometry and resent trends for solving problems with various algorithms.

Text Books:

1. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, 4 th Edition, 2014, Pearson.
2. Introduction to Algorithms, Thomas H Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, 3 rd Edition, 2009, The MIT Press.

Reference Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahani and Rajasekharam, 2nd Edition, 2009, University Press Pvt. Ltd.
2. Advanced Data Structures, Reema Thareja, S. Rama Sree, Oxford University Press, 2018.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Open Elective –I Courses

CODE	SUBJECT
OEC-CSE-521/ PCC-CE-325	Disaster Preparedness and Planning
OEC-CSE-522/ PCC-CE-524	Concrete Technology
OEC-CSE-523/ PCC-EE-322	Network Analysis and Synthesis
OEC-CSE-524/PEC-EE-721	Wind and Solar Energy Systems
OEC-CSE-525/PCC-ECE-522	Digital Communication Systems
OEC-CSE-526/PEC-ECE-521	Industrial Electronics

Semester V

Course Title: Disaster Preparedness & Planning **Maximum Marks: 100, Credit 3[2-1-0]**

Course Code: OEC-CSE-521/PCC-CE-325 **University Examination: 60**

Duration of Exams: 3 hours **Internal Assessment: 40**

Course Objective: To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences and to ensure skills and abilities to analyze potential effects of disasters and of the strategies and met to deliver public health response to avert these effects.

Unit-1

Disaster and Hazards:Definition of vulnerability, risk, capacity, impact, prevention, mitigation. ecological fragility; Factors affecting vulnerability; Sustainable and environmental-friendly recovery; Reconstruction and development.

Unit-II

Classification of Disasters:Natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.), Causes of natural disasters; Man-made disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills), Causes and concern of man-made disasters.

Unit-III

Disaster Impacts: Disaster impacts- Global (Climate change), regional (urban disasters) and local-environmental impacts (physical, social, ecological, economic, political, etc.), health impacts, psycho-social issues; demographic aspects (gender, age, special needs), Impact evaluation and analysis.

Unit-IV

Disaster Risk Reduction: Disaster management cycle phases; prevention, mitigation, preparedness, relief and recovery; Structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; Early warning systems, Post-disaster environmental response, Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit-V

Disasters management and control: Management of natural disasters (Earthquake, flood and drought), Various components and their functions; Man-made disasters (Industrial and nuclear disaster)-management and control, preventives measures, regulatory aspects.

Course Outcomes: At the end of completion of subject students will able to understand:

1. Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
2. Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.
3. Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
4. Capacity to manage the Public Health aspects of the disasters.
5. Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Text Books:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority). 64
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

Reference Books:

1. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
2. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each unit.

Semester V

Course Title: Concrete Technology **Max. Marks: 100, Credits 3[2-1-0]**
Course Code: OEC-CSE-522/PCC-CE-524 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: Concrete is the most important civil engineering material, often used with steel reinforcement. The course aims to give details about composition of concrete and its characteristics.

Unit I

Concrete and its Ingredients: Concrete, Properties of ingredients, tests, Production of concrete, mixing, compaction curing, Properties of fresh concrete, Defects in Concrete, Concrete additives.

Unit II

Properties of Concrete: Behaviour of concrete in tension and compression, shear and bond, Influence of various factors on test results, Time dependent behaviour of concrete -creep, shrinkage and fatigue.

Unit III

Concrete Mix Design: Concrete mix design; Proportioning of concrete mixes, basic considerations, cost specifications, factors in the choice of mix proportion, different method of mix design.

Unit IV

Concrete Operations and transportation: Concrete manufacturing methods(Batching plants) ,transportation(transit mixtures, concrete pumps) ,Quality control, Behavior of concrete in extreme environment; temperature problem in concreting, hot weather, cold weather and under water conditions, Resistance to freezing sulphate and acid attack, efflorescence, fire resistance; Inspection and testing of concrete-Concrete cracking, types of cracks, causes and remedies Non-destructive tests on concrete, Chemical tests on cement and aggregates.

Unit V

Admixtures and Special Concretes: Admixtures and their uses, Special concrete; types and specifications, Fibre reinforced and steel Fibre reinforced concrete, Polymer concrete, Deterioration of concrete and its prevention Repair and rehabilitation.

Outcome: After successfully studying this course, students will

1. Identify the suitability of materials for the construction works.
2. Able to understand the properties of concrete
3. Able to design the concrete mix design with using different methods of mix design.
4. Implement the special concreting methods required for Cold weather and Hot weather regions.
5. Able to understand the importance of admixture in concrete design.

Text Books:

1. **Neville. A M**: Properties of Concrete.
2. **Kulkarni, PD, Ghosh, RK and Phull, YR**: "Text Book of Concrete Technology"; New Delhi Oxford and IBH Publishing Co.
3. **Gupta BL and Gupta Amit**: "Text Book of Concrete Technology"; Standard Publishers Distributors, Delhi.

Reference Books:

1. **Varshney, RS:**"ConcreteTechnology";New Delhi, Oxford and IBH Publishing
2. **M.S. Shetty**: Concrete Technology.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester V

Course Title: Network Analysis & Synthesis **Max. Marks: 100 Credits: 4 [3-1-0]**
Course Code: OEC-CSE-523/PCC-EE-322 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Course Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of electrical networks and their synthesis.

Unit-I

Network Theorems & Network Topology: Network Theorems Superposition, Reciprocity and Millman's, theorems, Thevenin's and Norton's theorems; Maximum Power transfer theorem (A.C Analysis only).

Network Topology: Graph of a network, Concept of tree and co-tree, incidence matrix, tie-set, and cut-set schedules, Formulation of equilibrium equations in matrix form, Solution of resistive networks, Principle of duality.

Unit-II

Capacitive, Inductive Transients & First Order Circuits: Capacitive Transients, Inductive Transients, Combination of Capacitance & Inductance, Initial and Final Conditions, Exponential Functions, Timing Intervals of First and 2^{nd} Order Circuits. Laplace Transform application to solve differential equations and analysis of electric circuits.

Unit-III

Two Port Networks Parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port network in different parameters. Interconnection of two port networks. Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.

Unit-IV

Network Synthesis: Transfer Functions, Natural and Forced Responses, Poles and Zeros of Transfer Functions, Foster and Caure's Forms, Stability, Hurwitz's Polynomials.

Unit-V

Filter Synthesis: Introduction, Classifications of filters, Characteristic Impedance and propagation constant of pure reactive Networks, Ladder Network, T–Section, Pie Section, Terminating Half Section, Pass Bands and Stop Bands, Design of constant K, n – Derived Filters, Composite Filters.

Course Outcomes:At the end of this course, students will demonstrate the ability to

CO1. Apply network theorems for the analysis of electrical circuits.
CO2. Provide solution for First and second order networks and obtain the transient and steady-state response of electrical circuits.
CO3. Analyze two-port circuit behavior.
CO4. To synthesize various networks using different synthesis techniques.
CO5. To understand and synthesize different types of filters.

Text / References:

1. **M. E. Van Valkenburg**, "Network Analysis", Prentice Hall, 2006.
2. **D. Roy Choudhury**, "Networks and Systems", New Age International Publications, 1998.
3. **W. H. Hayt and J. E. Kemmerly**, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
4. **C. K. Alexander and M. N. O. Sadiku**, "Electric Circuits", McGraw Hill Education, 2004.
5. **K. V. V. Murthy and M. S. Kamath**, "Basic Circuit Analysis", Jaico Publishers, 1999.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester V

Course Title:Wind and Solar Energy Systems **Max. Marks: 100, Credits: 3 [3-0-0]**
Course Code: OEC-CSE-524/PEC-EE-721 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Course Objective: The objective of this course is to have overall knowledge about the various technologies for wind and solar power generation.

Detailed Contents:

Unit-I

Physics of Wind Power: History of wind power, Indian and Global statistics, Wind physics, Betz limit, Tip speed ratio, stall and pitch control, Wind speed statistics-probability distributions, Wind speed and power-cumulative distribution functions.

Unit-II

Wind generator topologies: Review of modern wind turbine technologies, Fixed and Variable speed wind turbines, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent-Magnet Synchronous Generators, Power electronics converters. Generator-Converter configurations, Converter Control.

Unit-III

The Solar Resource and Solar photovoltaic: Introduction, solar radiation spectra, solar geometry, Earth Sun angles, observer Sun angles, solar day length, Estimation of solar energy availability. Technologies-Amorphous, mono-crystalline, polycrystalline; V-I characteristics of a PV cell, PV Units, array, Power Electronic Converters for Solar Systems, Maximum Power Point Tracking (MPPT) algorithms. Converter Control.

Unit-IV

Network Integration Issues: Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behaviour during grid disturbances. Power quality issues. Power system interconnection experiences in the world. Hybrid and isolated operations of solar PV and wind systems.

Unit-V

Solar thermal power generation: Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.

Course Outcome:At the end of this course, students will demonstrate the ability to

CO1. Understand the basic physics of wind.
CO2. Understand the various wind generation topologies.
CO3. Understand the sun characteristics and solar photovoltaic systems.
CO4. Understand the power electronic interfaces for wind and solar generation.
CO5. Understand concentrated solar photo voltaic technology.

Text Books/ References:

1. **T. Ackermann**, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
2. **G. M. Masters**, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.
3. **S. P. Sukhatme**, "Solar Energy: Principles of Thermal Collection and Storage", McGraw Hill, 1984.
4. **H. Siegfried and R. Waddington**, "Grid integration of wind energy conversion systems" John Wiley and Sons Ltd., 2006.
5. **G. N. Tiwari and M. K. Ghosal**, "Renewable Energy Applications", Narosa Publications, 2004.
6. **J. A. Duffie and W. A. Beckman**, "Solar Engineering of Thermal Processes", John Wiley & Sons, 1991.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: Digital Communication Systems **Max Marks: 100 Credits: 3 [3-0-0]**
Course Code: OEC-CSE-525/PCC-ECE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Unit-I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling of analog signals, Quantization, Quantization error, signal to noise ratio due to Quantization, PCM Coding, Companding in PCM systems. Differential PCM systems (DPCM). BW of PCM. Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM DM systems and DPCM.

Unit-II

Line Coding Schemes: Basic definition, requirements of line coding schemes, different line coding techniques like NRZ (unipolar and bipolar), RZ, Manchester, Alternate mark and Inversion, HDBn, B8ZS, 4B/5B etc. coding schemes. Their properties and advantages.

Unit-III

Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, QAM, similarity of BFSK and BPSK, Constellation Diagram.

Unit-IV

Performance of Digital Communication Systems: Concept of noise, Various Noise types ,Additive white Gaussian noise, Bandlimited AWGN, probability of error coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

Unit-V

Spread Spectrum Modulation: Basic definitions of spread spectrum, advantages, Signal space Dimensionality and processing gain-Probability of error, Frequency hop spread spectrum - pseudo-noise sequences – Direct sequence spread spectrum with coherent binary phase shift keying – problem in spread spectrum systems.

Course Outcomes: After completion of the course student will be able to:

- **CO1.** Understand different pulse digital modulations and their advantages, disadvantages.
- **CO2.** Understand different line coding techniques and their properties.
- **CO3.** Differentiate between various digital modulation techniques and their advantages & disadvantages.
- **CO4.** Know about white Gaussian noise, mathematical modelling for different types of filters used to reduce noises in communication system.
- **CO5.** Understand different spread spectrum techniques.

Text Books:

1. Simon Haykin, Digital communications, John Wiley, 2005
2. H. Taub and D. Schilling, Principles of Communication Systems, TMH, 2003

Reference Books:

1. Sam Shanmugam, Digital and Analog Communication Systems, John Wiley, 2005
2. John Proakis, Digital Communications TMH, 1983
3. Singh & Sapre, Communication Systems Analog & Digital TMH, 2004
4. B.P. Lathi, Modern Analog & Digital Communication Oxford reprint,

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: Industrial Electronics **Max Marks: 100, Credits: 3 [3-0-0]**
Course Code: OEC-CSE-526/PEC-ECE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

D.C. Motor Control: Control of DC motor using half controlled and fully-controlled single-phase and three-phase thyristor converters, control of DC motor using choppers of different configurations.

Unit-II

A.C. Motor Control: Stator voltage control of induction motors, control of induction motors using voltage source and current source inverters, slip-ring induction motor control.

Unit-III

Industrial circuits: Temperature control circuit, AC voltage regulators, fan regulators/ lamp dimmers, uninterrupted power supplies (UPS). Relays and Timers: The relay (basic construction), AC relay, Reed relay, Solid state relay, 555 timer and its industrial applications.

Unit-IV

Design of Printed Circuit Boards: Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

Unit-V

Industrial Appliances Design: Power Transformers and Voltage Stabilizers, Design of 0.5 and 1.0KVA Voltage Stabilizers, Design of Inverters and Battery Chargers for domestic use.

Course Outcomes: After completion of the course student will be able to:

- **CO1.** Control speed of DC motors.
- **CO2.** Control speed of AC motors.
- **CO3.** Gain knowledge of various Industrial Components.
- **CO4.** Understand PCB design rules. Design of PCB using computer aided tools.
- **CO5.** Design Power transformers, voltage stabilizer, inverter and battery charger.

Text Books:

1. **Mohan N Undeland, T.M. Robins, W.P**. "Power electronics- converters, application & design", John Wiley 1989
2. **Bose B.K**., "Power electronics and A.C Drives", Prentice Hail 1986.

Reference Books:

1. **Dubey G.K. Asarbada, E.R, K**., "Power electronics devices", IETE book, TMH.
2. **Murphy J. M. D Turnnbull, F.G,** "Power electronics control of A.C motors".

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: Computer Networks Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE–511 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Lab Objectives:

1. To understand working principle of various communication protocols
2. To analyze various routing protocols
3. To know the concept of various data transfer between nodes.

List of Experiments:

1. Networks Cabling (Theoretical)
2. Networks Cabling (Practical)
3. Study of networking devices in detail.
4. Study of basic network command and network configuration commands.
5. Connect the computers in LAN.
6. Building a LAN with HUBs and Switches
7. IP Addressing and subnetting.
8. Introduction to Packet Tracer.
9. Performing an initial Switch configuration.
10. Performing an initial Router configuration.
11. Configuring a default route.
12. Configuring a static and default routes.
13. Implementation of RIP using Packet Tracer
14. Implementation of OSPF using Packet Tracer

Course Outcome: At the end of this course, the students will able to do following:

1. Understand fundamentals underlying of computer networks.
2. Understand details and functionality of computer network layered architecture
3. Compare routing networks.
4. Analyze performance of various communication protocols.

Note: This is only the suggested list of practical. Instructor may add or change some practical relevant to the course contents

Semester V

Course Title: Java Programming Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-512 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Course Objective:

This main Objective of this course is introduced to understand the basic concepts of Java,Class syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, multithreading. Writing and testing applets for inclusion in web pages.

List of Experiments:

1. Write a Java program to demonstrate the usage of constructor overloading.
2. Write a Java program to demonstrate the usage of Method Overloading and Overriding.
3. Write a Java program to demonstrate the usage of packages.
4. Write a Java program to demonstrate the usage of inheritance.
5. Write a Java program to demonstrate the usage of interfaces.
6. Write a Java program to demonstrate the usage of various keywords (Static,Super,Final,this).
7. Write a program to demonstrate exception handling
8. Write a program to demonstrate Applet
9. Write a program to demonstrate the concept of single thread creation and multithread creation, inter thread communication
10. Write a Java program to demonstrate the usage of String Classes
11. Write a program to demonstrate the concept of Several Collection Classes of Java.

Course Outcomes

1. Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.
2. Use and create packages and interfaces in a Java program
3. Implement exception handling in Java.
4. Implement Multithreading in java.
5. Use of Input/output Streams in java

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester V

Course Title: Microprocessors & Interfacing Lab **Max Marks: 50,Credits: 01[0-0-2]**
Course Code: PCC-CSE-513 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments

1. Study of 8085 and 8086 Microprocessor Kit.
2. Write a program to add and subtract two 8-bit and 16-bit number using 8085.
3. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8085.
4. Write a program to generate Fibonacci series using 8085.
5. Write a program to sort series using bubble sort algorithm using 8085.
6. To find the largest signed number in a given series of data using 8085.
7. To copy a block of data from one memory to another using 8085.
8. Write a program to add and subtract two 8-bit and 16-bit number using 8086.
9. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8086.
10. Write a program to generate Fibonacci series using 8086.
11. Write a program to sort series using bubble sort algorithm using 8086.
12. To find the largest signed number in a given series of data using 8086.
13. To copy a block of data from one memory to another using 8086.

Course Outcomes:

After completion of the course student will be able to:

1. Understand the various features of 8085 and 8086 microprocessor kits.
2. Write various arithmetic and logical based assembly language programs in 8085 and 8086.
3. Write various string manipulation based assembly language programs in 8085 and 8086.
4. Write basic data transfer programs using 8085 and 8086.
5. Function effectively as a team.

Note: This is only the suggested list of practical. Instructor may add or change some practical relevant to the course contents.

Semester VI

Course Title: Compiler Design **Max Marks: 100, Credits: 04 [3-1-0]**
Course Code: PCC-CSE-621 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The main objectives of these courses are to give students hands-on experience with crafting a simple compiler, working on a sizable software engineering project, using modern software tools, and most importantly correlating theory with practice.

Unit-I

Introduction to Compiler: Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Implementation of lexical analyzers, lexical-analyzer generator, Lex compiler, compiler construction tools, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

Unit-II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence Parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR (0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables, constructing LALR sets of items**.**

Unit-III

Syntax-Directed Translation: Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser.

Unit-IV

Symbol Tables: Data structure for symbols tables, representing scope information. Run-Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors**.**

Unit-V

Introduction To Code Optimization: Loop optimization, the DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis. Implementation of a subset of C using YACC**.**

Course Outcome:

1. Master building symbol tables and generating intermediate code.
2. Master generating assembly code for a RISC machine.
3. Master programming in Java.
4. Be familiar with compiler architecture.
5. Be familiar with register allocation.

Text Books

1. **Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman.** "Compilers Principles, Techniques and Tools". Pearson Education, 2008
2. **Chattopadhyay Santanu**; Compiler Design; Phi Learning (2009)

References Books:

1. **Aho, Sethi & Ullman**, "Compiler Design", Addision Wesley/ Pearson.
2. **O. G. Kakde**; Compiler Design,4/e; Universities Press (2008)

Note for paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Semester VI

Course Title: Computer Graphics and Multimedia **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC- CSE-602 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: To understand the basics of various inputs and output computer graphics hardware devices. Exploration of fundamental concepts in 2D and 3D computer graphics. To know 2D raster graphics techniques, 3D modeling, geometric transformations, 3D viewing.

Unit–I

Basic of Computer Graphics: Introduction to computer graphics, Applications of computer graphics, Display devices, Raster scan systems, Graphics input devices, Graphics software and standards.

Unit–II

Graphics Primitives: Points, lines, circles as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes.

Unit–III

2D Transformations and Viewing: Transformations, matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping, polygon clipping.

Unit–IV

3D Transformations & Introduction to Curves: curved lines and surfaces, spline representation, cubic spline interpolation methods, Bezier curves and surfaces, B-spline curves. 3D transformations: 3D scaling, rotation and translation, composite transformation, Projection: parallel and perspective.

Unit–V

Introduction to Multimedia: Introduction to multimedia, Multimedia computer system, Multimedia components, Multimedia terminology: communication modes, media types, Multimedia networks, Applications of multimedia, distributed multimedia systems, Synchronization

Course Outcomes:

1. Explain various applications of computer Graphics.
2. To be able to understand a graphics processing system.
3. To able to under and implement computer graphics algorithms.
4. To be able to implement 3D graphics primitives
5. To be able to understand and use multimedia aids.

Text Books:

1. **Steven Harrington**, Computer Graphics, A programming approach second Edn.
2. **J. D. Foley, A.Van Dam, S. K. Feiner and J. F. Hughes,** Computer Graphics; Principles and practice; Second Edition in C, Addison Wesley, 1997.

Reference Books:

1. **Rogers,** Procedurals elements of Computer Graphics, McGraw hill.
2. **Newman and Sproul**, Principle of interactive Computer Graphics, McGraw Hill.
3. **John F. Koegel Buford**, Multimedia Systems, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Design & Analysis of Algorithms **Max Marks: 100, Credits: 04 [3-1-0]**
Course Code: PCC- CSE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this course is to study various paradigms and approaches used to design and analyze algorithms and to appreciate the impact of algorithm design in practice for solving the problems.

Unit-I

Introduction to Algorithm: Areas of Study of Algorithms, Algorithm Design Paradigms, Concept of Algorithmic Efficiency, Run Time Analysis of Algorithms, Asymptotic Notations (O, Ω, Θ).

Divide and Conquer: Structure of Divide and Conquer Algorithms: Examples; Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Strassen's Matrix Multiplication; Analysis of Divide and Conquer Run Time Recurrence Relations.

Un1it-II

Greedy Method: Overview of the Greedy Paradigm, Examples of Exact Optimization Solution (Minimum Cost Spanning Tree Using Prim's and Kruskal's Algorithms), Approximate Solution (Knapsack Problem), Single Source Shortest Paths.

Unit-III

Dynamic Programming: Overview, Difference between Dynamic Programming and Divide and Conquer, Applications: Shortest Path in Graph (Multistage Graph, All-Pairs Shortest **Paths, Single-Source Shortest Paths:** General Weights), Matrix Chain Multiplication, Traveling Salesman Problem, Longest Common Sub-sequence Problem.

Unit-IV

Graph Searching and Traversal: Overview, Binary Tree Traversal, Graph Traversal Methods (Depth First and Breadth First Search).

Back Tracking: Overview, 8-Queens Problem, 0/1 Knapsack Problem.

Unit-V

Branch and Bound: LC Searching, Bounding, FIFO Branch and Bound, LC Branch and Bound Application: 0/1 Knapsack Problem, Traveling Salesman Problem. Concepts of Complexity Classes P, NP, Polynomial vs. Non-Polynomial Time Complexity, Reducibility, NP-Hard and NP-Complete Classes.

Course Outcomes: At the end of this course, the students are able to do the following:

1. Design algorithms using divide and conquer technique and also analyze them.
2. Design algorithms for different problems using greedy method.
3. Solve problems efficiently using dynamic programming techniques.
4. Design algorithms for graph traversal and search. Also application of backtracking technique to solve the problems.
5. Design algorithms for different problems using branch and bound technique. Also to categorize the problems into different classes.

Text Books:

1. **Horowitz E., Sahni S., &Rajasekaran S.**, Fundamental of Computer Algorithms, Galgotia Publication
2. **Basse Sara, Gelder A. V**., Computer Algorithms, Addison Wesley.

Reference Books:

1. **Cormen T. H., Leiserson**, Rivest and stein, Introduction of Computer algorithm, PHI.
2. **Goodrich and Tamassia**, Algorithm Design, Wiley student edition.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Artificial Intelligence **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PCC-CSE-624 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The student should be made to learn the various Artificial intelligence frame work, Knowledge representation, problem solving, and natural language.

Unit-I

Introduction to Artificial Intelligence: Problem Solving Concepts. Definition of Pattern Recognition. Production System. Problem and Production. System Characteristics. Two Path Problem. Analysis of Artificial Intelligence Techniques. Criteria and Success.

Unit-II

Knowledge Representation: Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning, Scripts. Production Systems.

Unit-III

Problem Solving Algorithms: State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

Unit-IV

Understanding Natural Languages: Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Unit-V

Expert System: Need and justification for expert systems, knowledge acquisition
Learning: Concept of learning, learning automation, genetic algorithm, learning types.
Programming Language: Introduction to programming Language PROLOG.

Course outcome:

1. Understand basics of artificial intelligence
2. Knowledge representation
3. Understanding problem solving techniques
4. Understand natural languages.
5. Understanding Expert system and learning methods

Text Books:

1. **E. Rich and K. Knight**, "Artificial intelligence", TMH, 2nd ed., 1992.
2. **N.J. Nilsson**, "Principles of AI", Narosa Publ. House, 1990.
3. **John J. Craig**, "Introduction to Robotics", Addison Wesley publication
4. **Richard D. Klafter, Thomas A. Chmielewski, Michael Negin**, "Robotic Engineering – An integrated approach", PHI Publication

Reference Books:

1. **D.W. Patterson**, "Introduction to AI and Expert Systems", PHI, 1992.
2. **Peter Jackson**, "Introduction to Expert Systems", AWP, M.A., 1992.
3. **R.J. Schalkoff**, "Artificial Intelligence - an Engineering Approach", McGraw Hill Int. Ed., Singapore, 1992.
4. **M. Sasikumar, S. Ramani**, "Rule Based Expert Systems", Narosa Publishing House, 1994.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Professional Elective-II Courses

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-621	Advanced Java	PEC –CSE-624	Wireless Networks
PEC –CSE-622	Computer Based Numerical Techniques	PEC –CSE-625	Social Network Analysis
PEC –CSE-623	R-Programming		

Semester VI

Course Title: Advanced Java **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-621 **University Exam: 60**
Duration of Exam: 3 hour **Internal Assessment: 40**

Course Objective: To emphasize on the basic concepts of advanced Java and web based development.

Unit-I

Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons, Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells, Introduction to GUI Programming with JavaFX: JavaFX Controls and Menus, Comparison among the AWT, Swing, and JavaFX.

Unit-II

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data.

Unit-III

Advance Networking: Client Server Computing, Socket programming, Content and Protocol Handler, TCO & UDP protocol, developing distributed application, RMI, Remote object, Object Serialization.

Unit-IV

Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and running servlet, Reading the servlet Parameters, Reading Initialization parameter, Packages-javax, servlet Package, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

Unit-V

Java Beans: Java Bean, Installing, Starting Bean Development Kit, Use of JAR files and the use of Java Beans API.

JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriplets and Comments), JSP Implicit Object, Object Scope, Synchronization Issue, Session Management, Directive and Custom tag libraries.

Course Outcomes: At the end of this course, the students will be able to do the following:

1. Understanding and designing of GUI
2. Understanding the Java Database connectivity
3. Understanding and designing the distributed and web-based applications
4. Understanding the Server-side and client-side programming
5. Understand JSP and its usages

Text Books:

1. **Gary Cornell and Horstmann Cay S.,** Core Java, Vol I and Vol II, Sun Microsystems Press.
2. **Herbert Schildt**, Java: The Complete Reference, McGraw-Hill**.** Ninth Edition**.**

References:

1. **Philip Hanna,** JSP: The Complete Reference, McGraw-Hill.
2. **Deital and Deital,** Java How to Program, Prentice Hall (2007).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Computer Based Numerical Techniques **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE–622 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective*:* The objective of this course is to introduce students to the various numerical techniques which find their applications in almost every sphere of Science and Engineering.

Unit-I
Introduction: Errors and Significant Digits. Algebraic Equations: Bisection Method, Secant Method, Newton Raphson Method, Graeffe's Root Squaring Method, Regula-FalsiMethod
Unit-II
Solution for Systems of Equations: Gauss Elimination, Gauss Jordan and Partition Method for Linear System of Equations.
Unit-III
Interpolation: Introduction. Forward, Backward, Central and Divided Differences, Newton`s Formula for Equal and Unequal Intervals. Lagrange`s Interpolation Formula.
Sterling`s and Bessel`s Formula.
Unit-IV
Numerical Integration and Differentiation: Introduction. Trapezoidal Rule,Simpson`s 1/3 Rule, Simpson`s 3/8 Rule. Gaussian Integration.
Unit-V
Difference Equations and their Solutions: Numerical Methods, Taylor Series Methods,Euler`s Method, Range Kutta Method, Predictor Corrector Method, Adams Bashforth Method.

Course Outcomes: At the end of this course, the students will able to do the following:
1. Understand Various Numerical Techniques and their applications.
2. Implement various numerical solution algorithms using c programming.
3. Be familiar with calculations and interpretation of errors in numerical method.
4. To learn various integration and differentiation formulas in the field of computer science and engineering.
5. Understanding the implications of approximations.

Text Books:
1. **Balagurusamy**, Numerical Methods, TMH.
2. **V. Rajaraman**, Introduction to Numerical Methods, TMH.

Reference Books:
1. **Schilling**, Applied Numerical Methods for Engineers using MATLAB and C, CengageIndia.
2. **Cheney**, Numerical Mathematics & Computing, Cengage India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: R Programming **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this course is to provide the basic idea of the R Programming, and its application in different areas.

Unit-I

Introduction: Overview of R Programming, Environment Setup, Basic Syntax, Data Types,Variables,operators,Decision Making, loops, Functions, Strings, Vectors, Lists, Matrix, Arrays, Factors, Data Frames,Packages,Data Reshaping

Unit-II

R Data Interfaces—CSV Files, Excel Files, Binary Files, XML Files, JSON Files, Web Data, Database

Unit-III

Plotting: Charts and Graphs—Pie Charts, Bar Charts, Boxplots, Histograms, Line Graphs, Scatter Plots

Unit-IV

Machine Learning: Mean, Mode, Median, Linear Regression, Multiple Regression, Logistic Regression, Normal Distribution, Binomial Distribution, Poisson Distribution, Analysis of Covariance, Time Series Analysis, Non Linear Least Square, Decision Tree, Random Forest, Survival Analysis, Chi Square Tests

Unit-V

Statistical Functions: Frequency and Partition values, Graphics and Plots,Central Tendency and Variation, Boxplots, Skewness and Kurtosis

Course Outcomes: At the end of the course, the students will be able to do the following:

1. Understanding the concept of R Programming
2. Using the R programming for the data analysis
3. Apply the R Programming for plotting various graphs
4. Apply R Programming for statistical analysis
5. Implementing various algorithms using R Programming

Text Books:

1. **Norman Matloff "**The Art of R Programming" Cengage Learning
2. **Lander and Pearson** "R for Everyone".

Reference Books:

1. Siegel, S. (1956), Nonparametric Statistics for the Behavioral Sciences, McGraw-Hill International, Auckland.
2. **Paul Teetorand Oreilly**"R Cookbook".

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Wireless Networks **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC- CSE-624 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The aim of the subject is to acquaint the students about the present scenarios of various wireless networks

Unit-I
Introduction to Wireless Networks: Wired vs Wireless Communication, Present scenario of Wireless Networks, Comparative analysis of Different Generations of Networks, Operation of Cellular Wireless Networks
Unit-II
Wireless LANS: Infrared LANS, spread spectrum LANS, narrowband microwave LANS, IEEE 802.11 wireless LAN standard, Mobile IP
Unit-III
Satellite communications: Brief History, Applications, satellite parameters & configurations-GEO, LEO, MEO, Capacity allocation (frequency division, time division.
Unit-IV
Ad Hoc wireless Networks: Introduction to Ad Hoc networks, Difference between Infrastructure based and Ad-Hoc wireless networks, applications, challenges and issues, measures to improve the quality of service (QoS) in Ad hoc networks
Unit-V
Optical Wireless Networks (OWC): Introduction, Indoor and outdoor optical wireless networks, optical wireless communications vs Radio Frequency (RF) wireless Communication, Applications of optical wireless Networks, atmospheric effect on OWC

Course Outcomes: On successful completion of this unit students will be able to:
1. Understand the present scenario of wireless networks
2. Identify the basic concept of wireless networks along with its types
3. Compare LEO, MEO and GEO satellite communication
4. Get an insight into Ad hoc networks
5. Understand the need and potential of optical wireless networks

Text Books:
1. **Stallings William**, Wireless Communications & Networking, PHI.
2. **PahlavanKaven,** Principles of Wireless Networks,, Pearson Education India.

Refernce Books:
1. **Nicopolitidis, H. S. Obaidat**, Wireless Networks, John Wiley.
2. **Stoimenovic Ivan**, Handbook of Wireless Networks & Mobile Computing, CRS Presss.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester-V

Course Title: Social Network Analysis **Max Marks: 100**

Course Code: PEC-CSE-625 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course offers the study of highly interconnected and complex world using graphs and revelation of their properties with the tools.

Unit-I

Social Media- Descriptions and Definitions-social media networks-introduction, rise of social media for consumer applications, applying social media to national priorities Social Media Marketing - Theory and Practice, Social Media Marketing (including Viral Marketing), Mobile Marketing

Unit-II

Web Analytics, Social Media Analytics - Criteria of Effectiveness, Metrics, Techniques (e.g., Social Network Analysis, Semantic Analysis, Online Sentiment Analysis), Tools, Social Media Management, Centrality Measures-opinion mining, feature based sentiment analysis,

Unit-III

Community Detection-communities in social media, community detection, taxonomy of community criteria, nodes-centric community detection, complete mutuality: cliques, group-centric community detection, latent space models, spectral clustering, hierarchy-centric community detection. Community evaluation- measuring a clustering result, normalized mutual information, evaluation using semantics,

Unit-IV

Mining Social Network Data, Network Topology Discovery, Link Prediction- definition of link prediction problem, challenges, methods for link prediction-shortest path, neighbourhood based preferential attachment, ensemble of all paths, hitting and commute times,

Unit-V

Link Prediction - Page rank. Comparison of different methods. Managing Big Data, Case Studies-semantic analysis-handling internet slang

Course Outcomes: After completion of the course student will be able to:

1. Understand working and application of social network platforms
2. Understand Web and Social Media Analytics
3. Identify and detect communities in Social Networks
4. Create and Discover network topology
5. Understand Link prediction techniques.

Text and Refrence Books

1. **David Easley and Jon Kleinberg**, Networks, Crowds and Markets, Cambridge University Press, 2010.
2. **Matthew O. Jackson**, Social and Economic Networks, Princeton University Press, 2010.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Open Elective II Courses

CODE	SUBJECT
OEC-CSE-621/ PCC-CE-425	Building Materials & Construction
OEC-CSE-622/ PEC-CE-666	Remote Sensing and GIS
OEC-CSE-623/ PCC-EE-421	Renewable Energy Sources
OEC-CSE-624/ PEC-EE-622	Energy Audit and Management
OEC-CSE-625/ PCC-ECE-421	Signals & Systems
OEC-CSE-626/ PCC-ECE-621	Digital Signal Processing

Semester-VI

Course Title: Building Materials & Construction **Max. Marks: 100, Credit 3 [2-1-0]**
Course Code: OEC-CSE-621/PCC-CE-425 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to make the students aware about the knowledge of the materials used in buildings and constructional forms like partitions, DPC, floors and roofs etc.

Unit-I

Stones and Bricks: Stones: Classification, requirements of good materials, Querying of stones Testing of stones. Bricks: Classification of bricks, Properties of Conventional bricks, Autoclave aerated blocks (AAC), Fly ash bricks, manufacturing and testing procedures of Conventional bricks, Autoclave aerated blocks (AAC), Fly ash bricks.

Unit-II

Cement and Admixtures: Cements: Grades, Composition, manufacturing of Portland cement, field testing of cement, special types of cements (Introduction only), storage of cement. Admixtures: types (Fly ash, Micro silica, Ground granulated blast-furnace slag (GGBS), Chemical Admixtures etc.), Properties and their suitability, advantages, disadvantages and limitations.

Unit-III

Steel, Timber and Polymers: Steel: Types of steel (Mild Steel, Hard Steel, Stainless Steel, Heat resistance steel, Manganese steel, Magnet Steel), Steel marketable forms of steel. Timber: Classification, Structure, Seasoning and defects. Paints and Varnishes, Constituents of paints, types of paints (oil paint, enamel paint, emulsion paint cement paint), constituents and characteristics of varnishes,Polymers: Classification, properties and applications in civil engineering of Polymeric materials viz. PVC, Polyester, HDPE, and LDPE.

Unit-IV

General Construction: Brick and Stone masonry: Various terms used, types and bonds in brick work. Partition and cavity walls: Types of non-bearing partition, brick partitions, clay block partitions, Gypsum board Partition, timber partitions and glass partitions, construction of masonry cavity walls.

Unit-V

DPC, Floors and Roofs: Dampness: Sources, effects and prevention of dampness, Materials used in damp proofing course. Floors: Components of floor, brick floors, cement concrete floors, terrazzo flooring, mosaic floorings and tiled flooring, Tiles and Terra-cotta: Manufacturing of tiles and terra-cotta (introduction only), types of terra cotta. Doors and Windows: Locations, sizes general types of door movement, various types of doors and windows (definition only). Roofs (Single Roof: Lean-to-roof, Couple roof, Couple closed roof, Collar-beam roof) & terms used in sloping roof: king post truss, queen post truss.

Course Outcomes: After successful completion of the course, student will be able to

1. Identify various construction materials like stone and bricks
2. Know and differentiate elemental properties of construction materials
3. Know about the different types of materials used in construction such as steel timber polymers
4. Demonstrate an appropriate application of construction material.
5. Know about the different components in construction building.

Reference Books:

1. **Surinder Singh**, Engineering Materials
2. **Sharma and koul,** Building Construction
3. **Kulkarni et.el,** Civil Engineering Materials
4. **B.C. Punmia**, Building Construction

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester-VI

Course Title: Remote Sensing & GIS **Max. Marks: 100, Credits 3[2-1-0]**
Course Code: OEC-CSE-622/PEC-CE-666 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objectives: Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on-site observation, especially the Earth.

Unit-I

Introduction: Introduction to Remote Sensing, Data acquisition and processing, Applications, Electromagnetic Radiation (EMR) and its characteristics, Planck's Law, Stefan's Law, Wein's Displacement law, Properties of solar radiant energy, Atmospheric windows.

Unit-II

Physical basis of remote sensing:Interaction in the atmosphere, nature of atmospheric interaction, atmospheric effects of visible, near infrared thermal and microwave wavelengths, interaction at ground surface, interaction with soils and rocks, effects of soil moisture, organic matter, particles, size and texture, interaction with vegetation, spectral characteristics of individual leaf, vegetation canopies, effect of leaf pigments, cell structure, radiation geometry.

Unit-III

Platform and sensors:Multi concept in remote sensing, general requirements of a platform, balloon aircraft, satellite platforms sun-synchronous orbits, sensors for visible and near infrared wavelengths, profilers, images, scanners, radiometers, optical mechanical and push button scanners, spectral, spatial, radiometric and temporal resolution, IFOV, FOV, geometric characteristics of scanners, V/H ratio, comparison of some satellite/ aerial platforms and sensors and remote sensing data products, land sat MSS and TM, SPOT, IRS, ERS etc.

Unit-IV

Geographical Concepts and Terminology: Difference between image processing system and geographical system (GIS), utility of GIS, various GIS packages and their salient features, essential components of a GIS, scanners and digitizers.

Unit-V

Data Base: Raster and vector data, data storage, hierarchical data, network systems, relational database, data management, conventional database management systems, spatial database management, data manipulation and analysis, reclassification and aggregation, geometric and spatial operation on data management and statistical modeling, applications of GIS in various natural resources and engineering applications.

Course outcome: After successfully studying this course student will:

1. Able to understand Remote Sensing and data acquisition and processing, sensor Systems and its applications.
2. Know the nature of atmospheric interaction, atmospheric effects of visibility and, interaction with soils and rocks etc.
3. Understand multi concept in remote sensing and balloon aircraft and comparison of some satellite/ aerial platforms and sensors and remote sensing data products.
4. Understand difference between image processing system and geographical system (GIS), utility of GIS and essential components of a GIS.
5. Know the raster and vector data, data storage, hierarchical data, network systems, relational database, data management, conventional database management systems and applications of GIS in various natural resources and engineering applications.

Text Books:

1. Remote Sensing and Image Interpretation: T.M. Lillensand and R.W. Keifer
2. Principles of Remote Sensing : P.J. Curren
3. Principles of Geographical Information systems for land Resources Assessment : P.A. Baurrough

Reference Books:

1. Manual of Remote Sensing, Vol.2 : American Society of Photogrammetry and Remote Sensing
2. Geographical Information systems- A Management Perspective : Stan Aromoff

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each

Semester-VI

Course Title: Renewable Energy Sources **Max. Marks: 100, Credits: 3[3-0-0]**
Course Code: OEC-CSE-623/ PCC-EE-421 **University Exam: 60**
Duration of Exam: 3Hours **Internal Assessment: 40**

Course Objective: The course is designed to give knowledge of various renewable energy sources, systems and applications in the present context and need.

Unit-I

Energy Scenario in India, Renewable and Non-renewable Energy sources, Causes of Energy Scarcity, Solution to energy Scarcity, Need for Renewable Energy, Advantages and Disadvantages of Renewable energy, Renewable Energy statistics worldwide and India.

Unit-II

Solar energy, solar photovoltaic, PV Technologies-Amorphous, Monocrystalline, polycrystalline-I characteristics of a PV cell, PV module, array, Maximum Power Point Tracking (MPPT) algorithms, Concentrated Solar Power, types of collectors, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, Application of Solar Power, Economic Policies to Promote Solar Energy.

Unit-III

Introduction, Electricity Generation using Wind Energy Generators (WEG), Evaluating Wind Turbine Performance, Wind Potential, Wind Energy in India, Wind Turbine Size and Power Ratings, Advantages of Wind-Generated Electricity, Cost Issues, Environmental Concerns, Supply and Transport Issues.

Unit-IV

Bio energy, Types of Bio Gas Plants, tidal energy, classification of Tidal Plants, Geothermal Power plants, ocean thermal energy systems, Open OTEC Cycle, Closed OTEC Cycle. Introduction to Magneto Hydro Dynamics (MHD) Power & fuel cells, types of fuel cells.

Unit-V

Energy storages: Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome: After learning the subject, student will be able to:

CO1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources
CO2. Demonstrate the knowledge of physics of solar power generation and the associated issues.
CO3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.
CO4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.
CO5. Demonstrate the ways by which energy can be stored indifferent forms.

Text Books/References:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
2. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
3. Non-conventional energy resources, Shobh Nath Singh, Pearson India
4. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
5. Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester-VI

Course Title: Energy Audit and Management **Max. Marks: 100, Credits: 3 [3-0-0]**

Course Code: OEC-CSE-624/ PEC-EE-622 **University Exam: 60**

Duration of Exam: 3 Hours **Internal Assessment: 40**

Course Objective: This course gives an overview of various aspects of conservation, management & audit of electrical energy.

Unit-I

Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energystrategy for the future, air pollution, climate change. Energy Conservation, Energy Conservation Act and its features.

Unit-II

Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

Unit-III

Energy Efficiency in Electrical Systems: Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

Unit-IV

Energy Efficiency in Industrial Systems: Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fans and blowers: Types, performance evaluation, efficient system operation, Pumps and Pumping System: Types, performance evaluation, efficient system operation.

Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling

Unit-V

Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lighting controls, energy saving potential of each technology.

Course Outcomes: At the end of this course, students will demonstrate the ability to

CO1. Understand the current energy scenario and realize the need for new reforms to efficiently manage the energy resources.

CO2. Learn various auditing techniques used for proper energy management.

CO3. Realize how energy conservation could be done in Electrical Systems by managing the energy losses and malpractices.

CO4. Realize how energy conservation could be done in Industrial Systems by finding out thefactor affecting the performance of various industrial devices and mitigating the same.

CO5. How electrical energy management could be achieved using new energy efficient devices.

Text Books/Reference:

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online)
3. S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.
4. Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester-VI

Course Title: Signals & Systems **Max Marks: 100,Credits: 4 [3-1-0]**
Course Code: OEC-CSE-625/PCC-ECE-421 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The objective of this course is to study and analyze the characteristics of continuous and discrete signals and systems**.**

Unit-I

Introduction: Definitions of a signal and a system, classification of signals, elementary signals, and basic Operations on signals, Systems viewed as Interconnections of operations, properties of systems.

Unit-II

Time-domain representations for LTI systems: Convolution and its significance, impulseresponse representation, Convolution Sum and Convolution Integral. Relationship between LTI system properties and the impulse response i.e., Causality, Stability, Step response.

Unit-III

Fourier representation for signals: Fourier representation for signals, Continuous -time Fourier series and their properties, Application of Fourier Series to LTI systems, Continuous –time Fourier Transform & its properties, Applications of Fourier Transform to LTI systems, Fourier transform of periodic signals, Discrete-time Fourier Transform and its properties, Relationship of Fourier Transform to other transforms.

Unit-IV

Laplace Transforms–1: Introduction, Laplace transform, ROC and its properties, properties of Laplace transforms, inverse Laplace transform using partial fraction method. Transform analysis ofLTI Systems, unilateral Laplace Transform and its application to solve differential equations. Initial and final value theorems, Poles and Zeros of a system.

Unit-V

The Z Transform: Z-Transform- Unilateral and Bilateral, Region of convergence; Properties of the Z-transform; inverse Laplace transforms using long division and partial fraction method. Transform analysis of LTI Systems, Unilateral Z-transform and its application to differenceequations with zero and non-zero initial condition. Block diagram representation in Z-Domain.

Course Outcomes: After completion of the course student will be able to:

CO1. Represent different Signals in mathematical form and apply basic operations on Signals. Also, Student's must know physical significance of various elementary signals.

CO2. Classify systems based on their properties and determine the response of LTI systemusing convolution.

CO3. Represent Signals in frequency domain i.e. Analyze the spectral characteristics ofcontinuous-time periodic and aperiodic signals using Fourier analysis.

CO4. Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.

Text Books:

1. **Simon H. and B. Van Veen,** "Signals and Systems", Wiley & Sons,2001.Reprint 2002.
2. **B. P. Lathi,** "Linear Systems and Signals", Oxford University Press, 2005.

Reference Books:

1. **V. Oppenheim Alan,** Signals and Systems, PHI, 2nd Ed., 1997
2. **H. P Hsu, R. Ranjan,** "Signals and Systems", Scham's outlines, TMH, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will beset from each unit. The student has to attempt five questions at least one question from each unit.

Semester-VI

Course Title: Digital Signal Processing **Max Marks: 100, Credits: 4 [3-1-0]**
Course Code: OEC-CSE-621/PCC-ECE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Signals and Systems: Basic elements of DSP, Concept of frequency in Analog and Digital Signals, Sampling theorem, Discrete time signals, Systems, Analysis of discrete time LTI systems.

Unit-II

The Discrete Fourier Transform: Discrete Fourier transform (DFT), Properties of DFT: Periodicity, Linearity and Symmetry, Multiplication of two DFT's and Circular Convolution, Efficient Computation of the DFT: Computational complexity, FFT algorithms: Decimation-in- time and decimation-in-frequency.

Unit-III

Design of Digital IIR Filters: Discrete time IIR Filter from Analog Filter, IIR Filter Design: by Impulse Invariance, Bilinear Transformation, Approximation of derivatives (LPF, HPF, BPF), Structure for IIR Systems: Direct-Form Structures, Signal Flow Graphs and Transposed Structures, Cascade-Form Structures, Structures, Parallel-Form Structures.

Unit-IV

Design of Digital FIR Filters: Design of FIR Filters, Symmetric and Antisymmetric FIR Filters, Design of Linear-Phase FIR Filters: Using Windows (Rectangular Window, Hamming Window, Hanning Window) and by the Frequency-Sampling Method. Structures for FIR Systems: Direct- form structures, Cascade-form Structures.

Unit-V

Finite Word Length Effects in Digital Filters: Binary fixed point and floating point number representations. Quantization noise, Truncation and rounding, Quantization noise power, Input quantization error, Coefficient quantization error.

Course Outcomes: After completion of the course student will be able to:

- **CO1.** Understand the basic concepts of Discrete Fourier transform and its application to linear filtering.
- **CO2.** Understand and explain FFT algorithms and their computational efficiency in comparison to DFT.
- **CO3.** Understand and explain the design of IIR filters by approximation of derivatives, impulse invariance and bilinear transformation.
- **CO4.** Understand and explain the design of FIR filters by windowing and frequency sampling technique and provide a basic overview of special type of FIR filters.
- **CO5.** Understand and explain the realization of filters using cascade and parallel structures as well as signal flow graphs and provide brief overview of the application areas of DSP.

Text Books:

1. **J. G. Proakis and D. G. Manolakis**: DSP, 3rd Edition, Pearson Education, 2007.
2. **Johnny Johnson**: Digital Signal Processing, 3rd Edition, PHI.

Reference Books:

1. **Emmanuel C. Ifeachor, and Barrie. W. Jervis,** "Digital Signal Processing", 2nd Edition, Pearson Education, Prentice Hall, 2002.
2. **Sanjit K. Mitra**, "Digital Signal Processing-A Computer Based Approach" TMH, 2007.
3. **A. Oppenheim,** R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Person, 2004.
4. **Andreas Antoniou,** "Digital Signal Processing", Tata McGraw Hill, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Design & Analysis of Algorithms Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-631 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Course Objectives:

1. To learn the importance of designing an algorithm in an effective way by considering space and time complexity
2. Write programs using Divide-and-Conquer techniques.
3. Implement to find the minimum cost spanning tree and shortest path using different Greedy techniques.
4. Construct DFS, BFS programs and topological ordering.
5. Implement knapsack, travelling salesperson problem.

List of Experiments:

1. Write a program to implement binary search using divide and conquer technique.
2. Write a program to find maximum and minimum using divide and conquer technique.
3. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted. The elements can be read from a file or can be generated using the random number generator.
4. Implement a Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted .The elements can be read from a file or can be generated using the random number generator
5. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
6. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
7. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra's algorithm
8. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.
9. Print all the nodes reachable from a given starting node in a digraph using BFS method.
10. Check whether a given graph is connected or not using DFS method.
11. Implement N Queen's problem using Back Tracking.
12. Implement travelling salesperson problem.

Course Outcomes:

At the end of this course, the students able to do the following:

1. Implement programs on divide and conquer technique.
2. Demonstrate Quick sort and Merge sort and calculate the time required to sort the elements.
3. Experiment to find the minimum cost of spanning tree using Prim's algorithms and shortest path using Dijkstra's algorithm.
4. Construct programs to check graph is connected or not using BFS and DFS methods.
5. Implement N Queen's and travelling salesperson problem.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester VI

Course Title: Computer Graphics & Multimedia **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE-612 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

List of Experiments:

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham‟s Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham‟s Algorithm.
5. To implement polygon boundary fill algorithm.
6. To implement polygon flood fill algorithm.
7. To translate an object with translation parameters in X and Y directions.
8. To scale an object with scaling factors along X and Y directions.
9. To rotate an object with a certain angle.
10. To perform composite transformations of an object.
11. Implementation of simple graphics animation.
12. Practice on Multimedia Tools

Course Outcomes:

At the end of this course, the students will able to do following:

1. Design and implementation of various algorithms to draw a number of shapes

Design and implementation of various algorithms for designing animation graphics and composite objects

2. Design and simulation of various algorithms using multimedia tools

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester VII

Course Title: Major Project Phase-I based on Software Engineering **Max Marks: 100**

Course Code: PROJ- CSE-721 **University Exam: Nil**

Internal Assessment: 100

Credits: 03[0-0-6]

During semester VII every student shall be allotted a Major Project-Phase-I based on Software Engineering under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Project. Major Project Phase-I based on Software Engineering shall be evaluated as per University statues.

Semester VII

Course Title: Fundamentals of Digital Image Processing **Max Marks: 100, Credits: 04[3-1-0]**
Course Code: PCC-CSE–721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: To introduce the different low level and high level computer vision techniques. Students are also made aware about the different image processing techniques.

Unit-I

Introduction to Image Processing: Digital Image Representation, Sampling & Quantization Fundamental Steps in Image Processing, Elements of Digital Image Process Systems, Application of Digital Image Processing, Relationship between Pixels. Brief Introduction to Image Data Types and File Formats, Intensity transform functions, Histogram processing.

Unit–II

Image Filtering: Spatial domain filtering, Fourier domain analysis**:** Fourier transforms and its properties, frequency domain filters, Homomorphism Filtering.

Unit-III

Image Compression: Coding redundancy, Inter-pixel redundancy, Psycho visual redundancy, Huffman Coding, Arithmetic coding, Run-Length coding, Lossy compression techniques, JPEG Compression.

Unit-IV

Image Morphological Processing: Introduction to basic operation on binary and grayscale images: Dilation, Erosion, Opening & Closing, Morphological Algorithms: Boundary & Region Extraction, Convex Hull, Thinning, Thickening, Skeletons, Pruning.

Unit-V

Image Segmentation, Representation & Descriptions: Point, Line and Edge Detection, thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Contour following, Boundary representations, Region Representations, shape properties, Boundary Descriptors, Regional Descriptors, Texture representations, Object Descriptions

Course Outcome: At the end of this course, students will demonstrate the ability to:

1. Have an understanding of various steps of Digital image Processing and image representation.
2. Understand and implement image enhancement in spatial domain and in frequency domain.
3. Understand image compression algorithms and choose an appropriate algorithm for specific application needs.
4. Understand and implement basic Morphological operation on Image.
5. Understand and implement image segmentation, representation and description.

Text Books:

1. Gonzalez and Woods: Digital Image Processing ISDN 0-201-600- 781, Addison Wesley 1992.
2. Forsyth and Ponce: Computer Vision A Modern Approach Pearson Education Latest Edition.

Reference Book:

1. Pakhera Malay K: Digital Image Processing and Pattern Recognition, PHI.
2. Trucco & Verri: Introductory Techniques for 3-D Computer Vision, Prentice Hall, Latest Edition.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Entrepreneurship Dev & Management **Max Marks: 100,Credits: 03[3-0-0]**
Course Code: HSMC-CSE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, Objectives, Functions and Type of Entrepreneurs, Importance of Entrepreneurship Training, Factors affecting Entrepreneurship in India, Linkage between Entrepreneurship and Economic Development, Problem of Increasing Unemployment, Balanced Regional Growth, Harnessing Locally Available Resources, New Industrial Policy and Innovation in Enterprises. Case Study of Successful Entrepreneurs.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centers and other Supporting Agencies.

Unit-III

Project Report Preparation: Identifying Business Opportunities(SWOT Analysis), Project Report and its Importance, Various Contents of Project Report: Managerial and Entrepreneurial Capabilities, Socio-Economic Benefits, Demand Analysis, Technical Feasibility and Financial Viability.

Unit-IV

Introduction to Marketing Management: Brief Introduction to various types of Product Strategies, Pricing Strategies, Channel Strategies and Promotional Strategies. Introduction to Production Management: Types of Production Systems, Production Planning and Control, Functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, Selection, Placement and Induction, Training and Development, Compensation.

Introduction to Financial Management: Source of Finance and Working Capital Management.

Course Outcomes: At the end of this course, the students will able to do following:

1. Have the ability to discern distinct entrepreneurial traits
2. Understand the systematic process to select and screen a business idea
3. Understanding the market strategy and constraints for new business ideas
4. Design strategies for successful implementation of ideas
5. Write a successful business plan

Text Books:

1. **Holt David H, Entrepreneurship**: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).
3. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Professional Electives III Courses (Code: PEC –CSE-721 to PEC –CSE-725)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-721	Cryptography and Network Security	PEC –CSE-724	Distributed Database System
PEC –CSE-722	Internet of Things	PEC –CSE-725	Advance Algorithms
PEC –CSE-723	Machine Learning		

Semester VII

Course Title: Cryptography and Network Security **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-721 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To understand the principles of encryption algorithms: conventional and cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

Unit-I

Introduction: Introduction to security, need of security, security attacks, services and mechanisms, introduction to cryptology, Conventional encryption model, classical encryption techniques substitution ciphers & transposition ciphers, cryptanalysis, steganography.

Unit-II

Modern block ciphers: Ideal block ciphers fiestel structure, principles, standards (DES), strength of DES, differential & linear cryptanalysis of DES, block cipher modes of operation, triple DES, AES encryption & decryption, key distribution, random number generation.

Unit-III

Public key cryptography: Principle of public key cryptography, prime and relative prime numbers, modular arithmetic, key management. Diffie-Hellman key exchange, elliptic curve architecture and cryptography, Introduction to number theory, RSA.

Unit-IV

Authentication and hash function: Authentication Recruitments, Authentication Functions and Message Authentication Codes. Digital Signatures, MD5 Message Digest Algorithm. Secure Hash Algorithm-I (SHA-1).

Unit-V

Network security & system level security: Electronics Mail Security**:** Pretty Good Privacy (PGP), S/MIME IP Security: IP Security Overview, Architecture, and Authentication Header. Web Security**:** Security Socket Layer & Transport Layer Security, System Security**:** Intruders, Viruses and Related Threats, Firewall Design Principles.

Course outcome: At the end of the course the students will be able to do following:

1. Understand cryptography and network security concepts and application.
2. Apply security principles to system design.
3. Identify and investigate network security threat.
4. Analyses and design network security protocols.
5. Conduct research in network security.

Text Books:

1. **William Stallings**, Cryptography and network security: principles and practices. Pearson Education India, 2006.
2. **Behrouz A. Forouzan, and DebdeepMukhopadhyay**. Cryptography and Network Security (Sie). McGraw-Hill Education, 2011.

Reference Books:

1. **Kaufman C., Perlman R. & Spenser M**., Network Security, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Internet of Things **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-722 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course objectives: The main objectives of this course are:

1. To assess the vision and introduction of IoT.
2. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
3. To Understand State of the Art - IoT Architecture.
4. To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Unit-I

Introduction to Internet of Things:What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.

Unit -II

IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4– BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security

Unit-III

IoT Architecture: IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.

Unit-IV

Web of Things: Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.

Unit-V

IoT Applications: IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Course Outcomes: After completion of this course, the students will able to do following:

1. Interpret the vision of IoT from a global context.
2. Compare and contrast the use of Devices, Gateways and Data Management in IoT.
3. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
4. To study and analyse data and to understand the security issues in IoT
5. To study IoT physical devices and end points and to understand the communications between components

Text book:

1. **Honbo Zhou**, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012.
2. **Dieter Uckelmann, Mark Harrison, Michahelles, Florian** (Eds), "Architecting the Internet of Things", Springer, 2011.
3. **David Easley and Jon Kleinberg**, "Networks, Crowds, and Markets: Reasoning About a HighlyConnected World", Cambridge University Press, 2010.
4. **Olivier Hersent, David Boswarthick, Omar Elloumi** , "The Internet of Things – Key applicationsand Protocols", Wiley, 2012.

Reference Books:

1. **Vijay Madisetti and Arshdeep Bahga**, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014
2. **Francis da Costa**, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything", 1st Edition, Apress Publications, 2013
3. **CunoPfister**, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493-9357-1

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Machine Learning **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-723 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To be able to formulate machine learning problems corresponding to different applications.
2. To understand a range of machine learning algorithms along with their strengths and weaknesses.
3. To understand the basic theory underlying machine learning.

Unit-I

Introduction: Well-Posed learning problems, Basic concepts, Designing a learning system, Issues in machine learning. Types of machine learning: Learning associations, Supervised learning (Classification and Regression Trees, Support vector machines), Unsupervised learning (Clustering), Instance-based learning (K-nearest Neighbor, Locally weighted regression, Radial Basis Function), Reinforcement learning (Learning Task, Q-learning, Value function approximation, Temporal difference learning).

Unit-II

Decision Tree Learning: Decision tree representation, appropriate problems for decision tree learning, Univariate Trees (Classification and Regression), Multivariate Trees, Basic Decision Tree Learning algorithms, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Unit-III

Bayesian Learning: Bayes theorem and concept learning, Bayes optimal classifier, Gibbs algorithms, Naive Bayes Classifier, Bayesian belief networks, The EM algorithm. Genetic Algorithms: Basic concepts, Hypothesis space search, Genetic programming, Models of evolution and learning, Parallelizing Genetic Algorithms

Unit-IV

Neural network representation, Neural Networks as a paradigm for parallel processing, Linear discrimination, pairwise separation, Gradient Descent, Logistic discrimination, Perceptron, Training a perceptron, Multilayer perceptron, Back propagation Algorithm. Recurrent Networks, dynamically modifying network structure.

Unit-V

Design and Analysis of Machine Learning Experiments: Guidelines for machine learning experiments, Factors, Response, and Strategy of experimentation, Cross-Validation and Resampling methods, measuring classifier performance, Hypothesis testing, Assessing a classification algorithm's performance, Comparing two classification algorithms, Comparing multiple algorithms: Analysis of variance, Comparison over multiple datasets.

Course Outcomes:

1. Student should be able to understand the basic concepts
2. Ability to formulate machine learning techniques to respective problems.
3. Apply machine learning algorithms to solve problems of moderate complexity.
4. Apply supervised and unsupervised learning to analyse data.
5. Analyze machine learning models.

Text Books:

1. Tom Michel, Machine Learning. McGraw Hill. 1997

2. Trevor Hus tie, Robert Tibshirani & Jerome Friedman. The Elements of Statically Learning, Springer Veriag 2001

Reference Books

1. William W Hsieh, Machine Learning Methods en the Environmental Science, Neural Network, Cambridge University Press.
2. Richard o Duda, Peter E. Hart and David G. Stork, Pattern Classification, John Wiley & Sons Inc,2001.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Distributed Database System **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-724 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. The aim is to impart knowledge to students regarding how distributed database functions and how it is different from traditional file system and centralized database.
2. To provide students knowledge about queries and how queries are handled in distributed database.
3. To provide students knowledge regarding deadlocks in distributed database.

Unit-I

Distributed Databases- An Overview: Introduction to Distributed Databases, Design issues of Distributed DBMS, Comparison of Distributed and Centralized Systems, DDBMS, Architecture of Distributed DBMS, Global Relations, Fragment and Physical Image, Types of Schemas, Methods of Fragmentation of a Relation, Levels of Transparency in a Distributed System, Integrity Constraints.

Unit-II

Query Processing: Objective and problems in Distributed Query Processing, Layers of Query processing, Characteristics of Query Processor, Query Decomposition: Representation of Database Operation in form of a Query, Operation in form of a Query, Operations on a Query, Unary and Binary Tree in a Query, Converting a Global Query into Fragment Query, Join and Union Operations Involving a Query, Aggregate Functions, Parametric Queries, data localization.

Unit-III

Optimization of Access Strategies: Introduction to Query Optimization, Estimation of Profiles of Algebraic Operations, Optimization Graphs, Reduction of Relation Using Semi-Join and Join Operation, Join ordering in distributed queries, Distributed query optimization Approach.

Unit-IV

Distributed Transaction Management: Properties and Goals of Transaction Management, Distributed Transactions, Types of Transactions, Recovery Mechanism in case of Transaction Failures, Log Based Recovery, Check Pointing, Communication and Site Failures In Case Of a Transaction and Methods to handle them, Serializability and Timestamp in Distributed Databases, Data Replication.

Unit-V

Concurrency Control & Reliability: Introduction to Distributed Deadlocks, Local and Global Wait for Graphs, Deadlock Detection using Centralized and Hierarchical Controllers, Prevention of Deadlocks, 2 and 3 Phase Locking and Commitment Protocols, Reliability in Commitment and Locking Protocols, Reliability and Concurrency Control, Reliability and Removal of Inconsistency.

Course outcomes: At the end of this course, the students will be able to do the following:

1. Differentiate the centralized and distributed database, its architecture. and other differences
2. Get knowledge of Query optimization, query trees and graphs.
3. How relational schema is fragmented for different locations and various methods to retrieve data from distributed location over a network.
4. Understand the various techniques of deadlocks recovery in a distributed database.
5. Understand the various techniques to handle transactions in a distributed database.

Text Books:

1. **Ceri Stefano and PelagattiGuiseppe**, Distributed Databases Principles andSystems, McGraw-Hill International Editions.
2. **M. Tamer Ozsu,** Principles of distributed database systems, Third Edition, 2011, Springer.

Reference Books:

1. **T. Connolly, Begg & Strachan,** Distributed Database Systems, Addition Wesley.
2. **Trindbery Tim**, Distributed Database System**,** John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Semester VII

Course Title: Advance Algorithms **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-725 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To provide the foundations of the practical implementation and usage of Algorithms and Data Structures. One objective is
2. To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of algorithms and data structures for different kinds ofproblems.
3. To expose the student to the algorithm analysis techniques, to the theory of reductions, and to the classification of problems into complexity classes like NP.

Unit- I

Algorithm Analysis: Asymptotic Notation, Amortization Basic Data Structure: Stacks and Queues, Vectors, Lists and Sequences, Trees, Priority Queues, Heaps, Dictionaries and Hash Tables Search Trees and Skip Lists: Ordered Dictionaries and binary Search Trees, AVLtrees, Bounded-Depth Search Trees.

Unit-II

Fundamental Techniques: The Greedy Method, Divide and Conquer, Dynamic Programming Graphs: The Grpah abstract data Type, Data Structures for Graphs, Graph Traversal, Directed Graphs.

Unit-III

Weighted Graphs: Single Source Shortest Paths, All pairs Shortest Paths, Minimum Spanning Trees Network Flow and Matching: Flows and Cuts, Maximum Flow, Maximum Bipartite Matching, Minimum Cost Flow

Unit-IV

Text Processing: Strings and Pattern Matching algorithms, Tries, Text Compression, Text Similarity testing. Number Theory and Cryptography: Fundamental Algorithms involving numbers, Cryptographic Computations, Information Security Algorithms and Protocols.

Unit-V

Computational Geometry: Range Trees, Prority Search Trees, Quadtrees and k-dTrees, Convex Hulls, N-P Complete.

Course Outcomes:

1. Basic ability to analyze algorithms and to determine algorithm correctness and timeefficiency.
2. Master a variety of advanced abstract data type (ADT) and data structures and their implementations.
3. Master different algorithm design techniques (brute-force, divide and conquer, greedy,etc.)
4. Ability to apply and implement learned algorithm design techniques and datastructures to solve problems.

Text Books:

1. **T.H. Cormen, C.E.Leiserson and R.L. Rivest,** Introduction to Algorithms.
2. **G.Brassard and P.Bratley**, Fundamentals of Algorithmics.

Reference Books:

1. **S. Dasgupta, C. Papadimitrou, U Vazirani,** Algorithms, by McGraw Hill.
2. **J. Klienberg and E. Tardos,** Algorithm Design, by Pearson Education Limited.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Professional Electives IV Courses (Code: PEC –CSE-726 to PEC –CSE-730)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-726	Advanced Multimedia System	PEC –CSE-729	Real Time Operating System
PEC –CSE-727	Cloud Computing	PEC –CSE-730	Block chain Technologies
PEC –CSE-728	Big Data Analysis	PEC –CSE-731	Advanced Mobile Communications

Semester VII

Course Title: Advanced Multimedia System **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE–726 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: To introduce the different multimedia techniques. Students are also made aware about the different concerns related to multimedia system.

Unit-I

Introduction to Multimedia, Multimedia Networks, Multimedia Information Representation, Media & Data Streams, Image, documents, Video & Audio File Formats & their representation.

Unit-II

Audio & Video Compression, Text & Image Compression. Multimedia Communications, Networks & Standards relating to Interpersonal Communication.

Unit-III

Interactive Applications over the Internet, Reference Models, Multimedia Operating System & Synchronization, Multimedia Applications & Multimedia Databases.

Unit-IV

Broadband ATM Networks, Protocol Architecture, ATM LANs, ATM MAN"s, High Speed PSTN, Access Technologies.

Unit-V

Architectures and Issues for Distributed Multimedia Systems: Distributed multimedia systems, Synchronization, QoS Architecture, The role of Standards, A frame work for Multimedia systems.

Course Outcomes: At the end of this course, the student able to do the following:

1. Understand the fundamental of multimedia system
2. Understanding and application of various data compression techniques
3. Design a interactive application using multimedia techniques
4. Designing of a multimedia system for the distributed environment
5. Understanding architecture and issues for multimedia

Text Books:

1. **Steinmetz R & K. Nahrstedt,** Mutimedia Computing, Communication & Application
2. **John F. Koegel Buford,** "Multimedia Systems" , Pearson Education.

References:

1. **JeffcoateJ**,Multimedia in Practice - Technology & Application .
2. **Fred Halsall,**"Multimedia Communications", Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Cloud Computing **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-727 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course offers a good understanding of cloud computing concepts and prepares students to be in a position to design cloud based applications.

Unit-I

Cloud Computing Basics: Cloud Computing Overview, Characteristics, Applications, Internet and Cloud, Benefits, Limitations, Challenges, Cloud Computing Services and Deployment Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Unit-II

Cloud Computing vs Other Computing Technologies: Overview of Grid, Peer-to-Peer, Pervasive and Utility Computing technologies; their characteristics and comparison with Cloud Computing.

Accessing the Cloud: Hardware and Infrastructure requirements, Access Mechanisms:
Web Applications, Web APIs, Web Browsers.

Unit-III

Understanding Abstraction and Virtualization: Virtualization Technologies, Load Balancing and Virtualization, Hypervisors, Machine Imaging.

Unit-IV

Scheduling in Cloud: Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling, Optimization techniques for scheduling.

Unit-V

Cloud Storage and Cloud Standards: Overview, Storage as a Service, Cloud Storage Issues, Challenges, Standards.

Cloud Security: Securing the Cloud, Securing Data, Establishing identity and presence.

Course outcomes: After completing the course, students will able to:

1. Develop and deploy cloud application using popular cloud platforms.
2. Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud.
3. Explain and identify the techniques of big data analysis in cloud.
4. Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
5. Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Text books\reference books:

1. **Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski**, Cloud Computing: Principles and paradigms, 2011
2. **Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter**, Cloud Computing: A Practical Approach, McGraw Hill, 2010.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Big Data Analysis **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-728 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course provides practical foundation level training and grounding in basic and advanced methods to big data technology and tools, including MapReduce and Hadoop and its ecosystem.

Unit-I

Big Data: Introduction, Characteristics, 5Vs, Sources of Big Data, Big Data technology and trends, Big Data Applications, Big Data Tools, Map Reduce Concept, Hadoop Introduction, Traditional Software Vs Hadoop, Distributed File System.

Unit-II

Hadoop Architecture: Introduction, Hadoop Storage- HDFS, Block Size, Replication, Common Hadoop Shell Commands, Hadoop versions. Hadoop Components:-Namenode, Secondary Namenode, Node Manager, YarnResource Scheduler, Map Reduce Paradigm,
Hadoop Programming. Cluster Setup:- SSH, Hadoop Configurations, Administration.

Unit-III

Hadoop Ecosystem: Big data pipeline, Difference between ETL & Big Data Streaming, Introduction to Hive, Hive Architecture & its installation, Hive Vs RDBMS, Kafka, Flume, Pig, Sqoop, Flume, Zookeeper, MapR, Cloudera, Hadoop Vs Spark, Introduction to Scala Programming.

Unit-IV

Data Analytics with R: Supervised Vs Unsupervised Learning, Clustering, Regression and Classification, Data Visualization (ggplot2 package), Rhadoop, Text Mining with R, Data Analytics Case Study.

Unit-V

Data Visualization, Business Intelligence (BI), Tools of BI, Functional and Technical Value of BI, Architecture of BI, Data Lake and BI, Introduction to Python Programming and its Libraries, Visualization using Python and Matlab.

Course Outcomes: After completing this course, the student should be able to:

1. Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data
2. Gain hands-on experience on large-scale analytics tools
3. Understand and study Hadoop ecosystem
4. Study R for text mining and to analyze data
5. Understand data visualization and to study python programming

Text Books:-

1. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
2. VigneshPrajapati**,** "Big Data Analytics with R and Haoop", Packet Publishing 2013.

Reference Books:-

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions",Wiley, 2015.
2. Chris **Eaton, Dirk deroos et al.** , "Understanding Big data ", McGraw Hill, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Real Time Operating Systems **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-729 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The aim of the subject is to provide basic and necessary information about the working of RTOS and Embedded Systems.

Unit-1

Introduction to RTOS and Embedded System: Brief History of Operating system, Introduction to real time operating system, Introduction to Embedded Systems, Definition of RTOS, Characteristics and Features Real Time Kernels, Scheduler, Objects, Services

Unit-II

Tasks & Memory Management:Tasks and memory management: Introduction, Defining Tasks, Task state and scheduling, Task operation, Task structures, Synchronization, communication and concurrency. Memory management concepts in RTOS.

Unit-III

IPC Mechanism: Defining Semaphore, Semaphore operation, use of semaphore. Defining Message queues, Message queue states, Message queue contents, use Pipes, Signals, and Condition variables.

Unit-IV

Exceptions & Interrupts: Defining exceptions and interrupts. How they are implemented. Applications of exceptions and interrupts, Types of interrupts, Handling interrupts

Unit-V

Timer & Timer Services: Real Time clocks and system clocks, Programmable interval timers, Timer interrupt, Service routines. Basic I/O concepts, The I/O Subsystem.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Understand the basic concept of RTOS and its usefulness for embedded systems
2. Understand Theoretical background and practical knowledge of real-time operating systems.
3. Understand multitasking techniques in real-time systems.
4. Understand the impact of real time operating systems on application area.
5. Understanding Several Timing services

Text Books:

1. **Qing Li**, Real Time concepts in Embedded Systems, CMP Publications.
2. **V. Penumchu**, Simple RTOS, Trafford Publications.

Reference Books:

1. **Mall Rajib**, Real Time Systems: Theory & Practice.
2. **C.M. Krishna,Kang,G.Shin,**Real Time Systems',Tata Mcgrawhill 1997

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Blockchain Technologies **Max Marks: 100**
Course Code: PEC-CSE-730 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of the course is to introduce the concept of Blockchain Architecture (public, private, consortium) which enables them to work with different blockchain technologies.

Unit-I

Cryptography: Traditional and Modern Cryptography techniques. Symmetric key cryptography, Asymmetric key cryptography (ECC and RSA), Signatures, hash.

Unit-II

Blockchain: definition, shortcomings of current transaction systems, distributed network, difference between blockchain and traditional database, evaluation of blockchain. Core Components of Blockchain Architecture, Bitcoin's block structure, node, Merkle Trees, Shared ledger, Mining, validators.

Unit-III

Consensus and cryptography behind the blockchain: Bitcoin Blockchain transaction flow. Blockchain need, use cases of blockchain, Types of Blockchain Architecture (public, private, consortium). How consensus works? Consensus in Bitcoin – I (The Basics, PoW and Beyond, The Miners), Permissioned Blockchain, proof of stake, delegated proof of stake, round robin, PBFT, POET.

Unit-IV

Ethereum: Public consortium blockchain: Introduction of Ethereum, Ethereum account, Ethereum network, Ethereum client, Ethereum gas, Ethereum virtual machine, Ethereum block, header, Ether. Solidity language: Writing smart contracts: Ethereum development: Preparing smart contract, development tools: remix, geth and mist etc., token standard.

Unit-V

Hyperledger: Private consortium: Hyperledger Burrow, Hyperledger Sawtooth, Hyperledger fabric, Hyperledger indy, Hyperledger iroha. Hyperledger suitability according to project. Tools in Hyperledger: Caliper, composer, explorer.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Understand the basic concept of modern and traditional cryptography techniques.
2. Comprehend the concept of Blockchain Architecture (public, private, consortium).
3. Demonstrate the Ethereum, Ethereum network, and Bitcoin's block structure.
4. Development of smart contracts: Ethereum development.
5. Demonstrate Hyperledger fabric and Hyperledger suitability for project development

Text Books:

1. Blockchain by Melanie Swa, O'Reilly, 1 edition (2015).
2. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos, O'Reilly, 1 edition (December 20, 2014).

Reference Books

1. Blockchain quick reference, by Brenn Hill, Packt Publishing; 1 edition (August 10,2018),

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

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Open Elective III Courses

CODE	SUBJECT
OEC-CSE-721/ PCC-CE-522	Environmental Engineering
OEC-CSE-722/ PEC-CE-770	Air and Noise Pollution Control
OEC-CSE-723/ PCC-EE-522	Power System-I
OEC-CSE-724/ PEC-EE-721	Wind and Solar Energy Systems
OEC-CSE-725/ PEC-ECE-723	Advanced 3G and 4G Wireless & Mobile Communication
OEC-CSE-726/ PEC-ECE-725	Biomedical Instrumentation

Semester-VII

Course Title: Environmental Engineering. **Max. Marks: 100 Credits 3[2-1-0]**
Course Code: OEC-CSE-721/ PCC-CE-522 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: This course aims to make students understand the various aspects of environment and to understand the impact of humans on environment.

Unit -I

Water quality and treatment: Water demand Residential, Commercial, Institutional, industrial and agricultural, Forecasting of water demand, Sources of Water, water quality parameters, Water quality standards, Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes, Water Supply systems, Components of water supply system, Distribution system, Plumbing and various valves used in water supply systems.

Unit II

Sewage Characteristics and treatment: Quantity of Sewage, Sewage flow variations, Characteristics and composition of sewage, Pollution due to improper disposal of sewage, Sewerage system and its components, Design of Sewerage system primary, secondary and tertiary treatment of sewage- description of various unit operation and processes, aerobic and anaerobic treatment systems, suspended and attached growth systems, quality requirements (Regulatory standards) for various usages.

Unit III

Air Pollution and control: Definition of Air pollution, major pollutants- sources and impacts, Air Quality standards, Air pollution meteorology, Plum rise and plum behaviour, Introduction to air quality models and their applications, Monitoring of air pollutants, Control measures.

Unit IV

Solid waste management- Solid waste, Municipal, industrial and hazardous solid waste, Characteristics and Composition of solid waste, Impact of improper disposal of solid waste, solid waste management, Elements of solid waste management system- generation, collection, transfer and transport, segregation, recycling, reuse, disposal, composting, vermin composting and landfills

Unit V

Noise pollution and control: Noise pollution, sources (Indoor and outdoor) and impacts, Permissible limits, measurement of noise, Addition of Noise, Noise propagation, control of noise pollution- at source.

Course Outcomes: After successfully studying this course, students will:

1. Understand the impact of humans on environment and environment on humans
2. Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.
3. Be able to plan strategies to control, reduce and monitor pollution.
4. Be able to select the most appropriate technique for the treatment of water, waste water solid waste and contaminated air.
5. Be conversant with basic environmental legislation.

Text books:

1. **Peavy, H.s, Rowe, D.R, Tchobanoglous,** G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York
2. **Metcalf and Eddy Inc**.: Wastewater Engineering
3. **Garg S.K**: Water Supply Engineering (Environmental Engineering Vol.–I)

4. **Garg S.K**: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Reference Books:

1. **Modi, P. N**;Water supply Engineering. Volume-I
2. **Gilbert Masters**, Introduction to Environmental Engineering and Science, PrenticeHall, New Jersey.
3. **P. Aarne Vesilind, Susan M.Morgan**, Introduction to Environmental Engineering, Thompson /Brooks/Cole.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Semester VII

Course Title: Air and Noise Pollution and Control **Max. Marks: 100, Credits: 3 [2-1-0]**
Course Code: OEC-CSE-722/PEC-CE-770 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Course Objectives: To understand the aspects of atmospheric pollution and its flow and know about the issues such as atmospheric composition, monitoring, acidic deposition, urban air quality

Unit I

Sources and Effects of Air Pollution: Classification of air pollutants, Particulates and gaseous pollutants, Sources of air pollution, Source inventory, Effects of air pollution on human beings-materials-vegetation-animals, global warming-ozone layer depletion, Sampling and Analysis, Basic Principles of Sampling, Source and ambient sampling, Analysis of pollutants ,Principles.

Unit II

Transport of Air Pollution: Elements of atmosphere and dispersion of pollutants, Meteorological factors, Wind roses, Lapse rate, Atmospheric stability and turbulence, Plume rise , Dispersion of pollutions, Gaussian dispersion models, Applications.

Unit III

Control of Air Pollution: Concepts of control of air pollution, Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation, Selection criteria for equipment, gaseous pollutant control by adsorption & absorption, condensation, combustion, Pollution control for specific major industries.

Unit IV

Air Quality Management: Air quality standards, Air quality monitoring, Air pollution control efforts, Zoning, Town planning regulation of new industries, Legislation and enforcement, Environmental Impact Assessment.

Unit V

Noise Pollution & Control: Sound and Noise: Sources of noise pollution, environmental and industrial noise; effects of noise pollution, fundamentals of sound generation - propagation, sound measurement, sound level meters, types, components, Noise prevention & control measures, environmental and industrial noise, noise control legislation

Course Outcomes: On completion of this course, the students will be able to

1. The main chemical components and reactions occur in the atmosphere and examine the factors responsible for perturbing this.
2. The Implementation of the methods for monitoring and modeling spatial and temporal patterns of pollution
3. The air pollution issues at a range spatial scales and how these are relaxed.
4. The environmental impacts of atmospheric pollutants and assess their concentration.
5. Understand the measures to be taken to control noise pollution.

Text Books:

1. M N Rao& H V N Rao (2007), Air Pollution, Tata McGraw-Hill Publishing Company, 26th reprint, New Delhi. ISBN: 0074518718
2. Noel De Nevers (2010), Air Pollution Control Engineering, 2nd Edition, Waveland Press, Inc., Long Grove, Illinois. ISBN: 978-1577666745

Reference Books:

1. Singal, S.P. (2000), Noise Pollution and Control, First Edition, Narosa Publishing House, New Delhi.ISBN: 8173193630
2. Rao C.S. (2006) Environmental Pollution Control Engineering, 2nd edition, New Age International,New Delhi. ISBN: 9788122418354
3. William L.Heumann (1997), Industrial Air Pollution Control Systems, McGraw Hill Professional, New York.ISBN: 9780070314306

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Semester VII

Course Title: Power System-I **Max. Marks: 100, Credits: 3 [3-0-0]**
Course Code: OEC-CSE-723/PCC-EE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Course Objective: The objective of this course is to develop an understanding of the diverse concepts of power system generation, transmission and distribution. It also involves the study of various power transfer methods and phenomenon associated with power system.

Unit-I

Electric Supply System: Typical A.C. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Advantages of High Transmission Voltage, Various Systems of Power Transmission, Comparison of Conductor Material in Overhead System, Comparison of Conductor Material in Underground System, Comparison of Various Systems of Transmission Elements of a Transmission Line, Economics of Power Transmission, Economic Choice of Conductor Size, Economic Choice of Transmission Voltage, Requirements of satisfactory electric supply, Main components of Overhead Lines, Conductor Materials, Bundled Conductors, Line Supports, Insulators, Type of Insulators, Potential Distribution over Suspension Insulator, String Efficiency, Methods of Improving String Efficiency, Corona, Factors affecting Corona, Advantages and Disadvantages of Corona, Methods of Reducing Corona Effect, Sag in Overhead Lines, Calculation of Sag, Some Mechanical principles.

Unit-II

Distribution System: Classification of Distribution Systems, A.C. Distribution, D.C. Distribution, Methods of obtaining 3-wire D.C. System, Overhead versus Underground System, Connection Schemes of Distribution System, Requirements of a Distribution System, Design Considerations in Distribution System. Types of D.C. Distributors, D.C. Distribution Calculations, D.C. distributor fed at one end (concentrated loading), Uniformly loaded distributor fed at one end, Distributor fed at both ends(concentrated loading), Uniformly loaded distributor fed at both ends, Distributor with both concentrated and uniform loading, Ring Distributor, Ring main distributors with Interconnector, 3-wire D.C. system, Current distribution in 3-wire D.C. System, Balancers in 3-wire D.C. system, Booster, Comparison of 3-wire and 2-wire D.C. distribution, Ground detectors. A.C. Distribution Calculations, Methods of solving A.C. Distribution Problems, 3-phase unbalanced loads, 4-wire, star-connected unbalanced loads, Ground detectors.

Unit-III

Constants of a Transmission Line: Resistance of a Transmission Line, Skin effect, Flux Linkages, Inductance of a Single Phase Overhead Line, Inductance of a 3-Phase Overhead Line, Concept of self-GMD and mutual GMD, Inductance Formulas in terms of GMD, Electric Potential, Capacitance of a Single Phase Overhead Line, Capacitance of a 3-Phase Overhead Line.

Unit-IV

Classification of overhead Transmission Lines: Performance of Single Phase Short Transmission Lines, Three-Phase Short Transmission Lines, Effect of load p. f. on Regulation and Efficiency, Medium Transmission Lines, End Condenser Method, Nominal T Method, Nominal Π Method, Long Transmission Lines, Analysis of Long Transmission Line, Generalised Constants of a Transmission Line, Determination of Generalised Constants for Transmission Lines.

Unit-V

Underground Cables: Construction of Cables, Insulating Materials for Cables, Classification of Cables, Cables for 3-PhaseService, Laying of Underground Cables, Insulation Core Cable, Dielectric Stress in a Single Core Cable, Most Economical Conductor Size in a Cable, Grading of Cables, Capacitance Grading, Inter sheath Grading, Capacitance of 3-Core Cables, Measurement of Cc and Ce, Current carrying capacity of underground cables, Thermal resistance, Thermal resistance of dielectric of single-core cable, Permissible current loading, Types of cable faults, Loop tests for location of faults in underground cables, Murray loop test, Varley loop test.

Course Outcome: At the end of this course, students will demonstrate the ability to

CO1. Understand the various concept of power system and realize its importance.
CO2. Understand the working of various distribution systems
CO3. Understand the various constants of transmission lines
CO4. Evaluate performance analysis on transmission lines
CO5. Understand various Underground Cables

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.
2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
3. **A. R. Bergen and V. Vittal,** "Power System Analysis", Pearson Education Inc., 1999.
4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.
5. **B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac**, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester VII

Course Title: Wind and Solar Energy Systems **Max. Marks: 100, Credits: 3 [3-0-0]**
Course Code: OEC-CSE-724/PEC-EE-721 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40** Course **Objective**: The objective of this course is to have overall knowledge about the various technologies for wind and solar power generation.

Unit-I

Physics of Wind Power: History of wind power, Indian and Global statistics, Wind physics, Betz limit, Tip speed ratio, stall and pitch control, Wind speed statistics-probability distributions, Wind speed and power-cumulative distribution functions.

Unit-II

Wind generator topologies: Review of modern wind turbine technologies, Fixed and Variable speed wind turbines, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent-Magnet Synchronous Generators, Power electronics converters. Generator-Converter configurations, Converter Control.

Unit-III

The Solar Resource and Solar photovoltaic: Introduction, solar radiation spectra, solar geometry, Earth Sun angles, observer Sun angles, solar day length, Estimation of solar energy availability. Technologies-Amorphous, mono-crystalline, polycrystalline; V-I characteristics of a PV cell, PV Units, array, Power Electronic Converters for Solar Systems, Maximum Power Point Tracking (MPPT) algorithms. Converter Control.

Unit-IV

Network Integration Issues: Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behaviour during grid disturbances. Power quality issues. Power system interconnection experiences in the world. Hybrid and isolated operations of solar PV and wind systems.

Unit-V

Solar thermal power generation: Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.

Course Outcome: At the end of this course, students will demonstrate the ability to

CO6. Understand the basic physics of wind.
CO7. Understand the various wind generation topologies.
CO8. Understand the sun characteristics and solar photovoltaic systems.
CO9. Understand the power electronic interfaces for wind and solar generation.
CO10. Understand concentrated solar photo voltaic technology.

Text Books/ References:

7. **T. Ackermann**, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
8. **G. M. Masters**, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.
9. **S. P. Sukhatme**, "Solar Energy: Principles of Thermal Collection and Storage", McGraw Hill, 1984.
10. **H. Siegfried and R. Waddington**, "Grid integration of wind energy conversion systems" John Wiley and Sons Ltd., 2006.
11. **G. N. Tiwari and M. K. Ghosal**, "Renewable Energy Applications", Narosa Publications, 2004.
12. **J. A. Duffie and W. A. Beckman**, "Solar Engineering of Thermal Processes", John Wiley & Sons, 1991.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Advanced 3G and 4G Wireless & Mobile Communication **Max Marks: 100**

Course Code: OEC-CSE-725/ PEC-ECE-722 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits: 3 [3-0-0]

Objective: This course is intended as an introductory course for the final year student to look at current and upcoming wireless communication technologies for broad band wireless access.

Unit-I

Cellular communication: Introduction to Cellular Communications, Frequency reuse, Multiple Access Technologies, Cellular Processes – Call Setup, Handover. CDMA: Introduction to CDMA, Walsh Codes, PN Sequences, Multipath diversity, RAKE Receiver

Unit-II

Wireless Communications and Diversity: Fading: Concept and its types, Fast Fading Wireless Channel Modelling, Rayleigh Fading Channels, BER Performance in Fading Channels, Diversity modelling for Wireless Communications, BER Performance Improvement with diversity, Types of Diversity.

Unit-III

OFDM: Introduction to OFDM, Multicarrier Modulation and Cyclic Prefix, Channel model and SNR performance, OFDM issues - PAPR, Frequency and Timing Offset Issues

Unit-IV

MIMO: Introduction to MIMO, MIMO channel capacity, SVD and Eigen modes of the MIMO channel, MIMO special multiplexing-BLAST, MIMO diversity-Alamouti, MIMO- OFDM

Unit-V

Ultra-wide band: UWB definition and features, UWB wireless channels, UWB data modulation, uniform pulse train, Bit error rate performance of UWB, Introduction to 5G Communication

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Course Outcomes: After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system and its working.
- **CO2.** Design different wideband channel model.
- **CO3.** Understand OFDM in detail, identify different OFDM issues.
- **CO4.** Identify different ST channels and design MIMO channel.
- **CO5.** To Understand Ultra-Wide Band technology.

Text Books:

1. **Arogyaswami Paul raj:** Introduction to space, time wireless communication. Cambridge university press
2. **John G Proakis**, Digital Communication, McGraw Hill.

Reference Books:

1. **Andreas Molisch**, Wireless communication-WILEY IEEE press
2. **Mischa Schwartz,** Mobile wireless communication- Cambridge university press

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Biomedical Instrumentation **Max Marks: 100, Credits: 3 [3-0-0]**
Course Code: OEC-CSE-726/PEC-ECE-725 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The aim of the course is to get the students acquainted with the Biomedical Instrumentation.

Unit-I

Introduction to biomedical instrumentation: Introduction of Biomedical Engineering, Biometrics, Man instrument system, Components of Man instrument system. Resting potential, action potential, typical wave form of action potential, propagation of action potential, recording of action potential.

Unit-II

Electrodes, Transducer and Amplifiers: Introduction of Bio-Electrodes, Properties of Bio-Electrodes, different types of electrodes, Sensors, Diaphragms, Force sensors. Introduction of transducers, classification of transducers, Biological Amplifiers (Instrumentation amplifies, chopper amplifiers)

Unit-III

Electro Potential Recording: The heart and cardiovascular system, ECG, EEG, EMG, lead systems and recording methods, typical waveforms and signal characteristics and block diagrams of ECG, EEG, EMG.

Unit-IV

Human Assist Devices: Cardiac pacemakers, Classification of Pacemakers, Defibrillators, AC Defibrillators, DC Defibrillators, Indirect measurement, direct measurement, automated indirect method, magnetic blood flow meters, ultrasonic blood flow meter.

Unit-V

Imaging Techniques: Introduction to X-rays, Properties of X-rays, Production of X-rays, Block Diagram of X-ray Machine, Ultrasound in medicine, physics of ultrasonic waves, types, A-mode, M-Mode, Doppler mode, Introduction of Computed tomography, Introduction of MRI.

Course Outcomes: After completion of the course student will be able to:

- **CO1.** Understand biomedical instrumentation, propagation of action potential.
- **CO2.** Acquire knowledge of electrodes, transducers & amplifiers used in biomedical instrumentation.
- **CO3.** Apply the knowledge of science, engineering fundamentals & engineering specialization for electrode potential recording.
- **CO4.** Understand different human assist devices.
- **CO5.** Gain knowledge of different imaging techniques used in medical science.

Text Books:

1. **Khandpur, R.S**., "Handbook of Biomedical Instrumentation", TATA McGraw-Hill, New Delhi, 1997.

Reference Books:

1. **Joseph J. Carr and John M. Brown**, Introduction to Biomedical Equipment Technology, John Wiley and Sons, New York, 1997.
2. **Leislie Cromwell**, Biomedical instrumentation and measurement, Prentice Hall of India, New Delhi, 2002

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Fundamentals of Digital Image Processing Lab **Max Marks: 50, Credits: 01[0-0-2]**
Course Code: PCC-CSE–731 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Working with Image Processing Toolbox
2. Importing and Exporting Images
3. Pre- and Post-Processing Images
4. Enhancing Images
5. Image Transforms
6. Image Conversions
7. Analyzing Images
8. Displaying and Exploring Images
9. Implement the basic gray level transformation functions.
10. Detect the edge of an image using canny, sobel, Prewitt, Laplacian, robert and LoG methods.
11. Write and execute programs for image frequency domain filtering
    a) Apply FFT on given image
    b) Perform low pass and high pass filtering in frequency domain
    c) Apply IFFT to reconstruct image
12. Implementation of image compression Techniques.
13. Write a program for image segmentation: Demonstration of global and local thresholding for segmentation.
14. Write the program for human Recognition.

Course Outcomes:

At the end of this course, the students able to do the following:

1. Understanding of various techniques for working on images
2. Simulation on images using Image Processing Toolbox
3. Design and Implementation of image compression Techniques.
4. Design and Implementation of image Segmentation Techniques.

Required Products

MATLAB,SciLab

Related Products

Image Acquisition Toolbox. Acquire ,Mapping Toolbox, Signal Processing Toolbox.

Note: This is only the suggested list of practical. Instructor may frame additional practical relevant to the course contents.

Semester VIII

Course Title: Major Project-Phase II **Max Marks: 450, Credits: 08[0-0-16]**
Course Code:PROJ- CSE–801 **University Exam: 200**
Internal Assessment: 250

The students are required to complete the Major Project-Phase II during semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the students shall be offered in house project on campus or they can complete their project work in any organization/industry outside the campus. Major Project- Phase II shall be evaluated as per university statues.

Professional Electives V Courses (Code: PEC –CSE-821 to PEC –CSE-825)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-821	Advanced Computer Architecture	PEC –CSE-824	Research Methodology
PEC –CSE-822	Expert System	PEC –CSE-825	Software Project Management
PEC –CSE-823	Neural Networks		

Semester VIII

Course Title: Advanced Computer Architecture **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-821 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this course is to learn the advanced aspects of computer architecture, design and analysis.

Unit-I

Introduction: Introduction to Parallel Processing and Pipelining, Array Computers, Multiprocessor Systems, Dataflow Diagrams and Applications of Parallel Processors, NUMA, UMA, COMA Models, Pipelining Vs Parallelism.

Unit-II

Pipeline Processors: Various Types of Pipeline Processors like Arithmetic Pipelines, Instruction Pipelines etc. Reservation Table, Design of various types of Pipelines, Instruction Pre-Fetching and Branch Handling in Pipelines, Data Buffering and Busing Structures in Pipelines, Design of Arithmetic and Logic Circuits, N-bit Parallel Adder.

Unit-III

Streams: Meaning of Instruction Streams and Data Streams, Classification of Computers based on these as SISD, SIMD, MISD and MIMD, SIMD Computer Organization, Various types of SIMD Interconnected Networks like Static and Dynamic Networks, Mesh-Connected, Networks, Cube Connected Networks etc. SIMD Matrix Multiplication and Parallel Sorting Algorithms.

Unit-IV

Arrays and Associative Processors: Various types of Array and Associative Processors, Loosely and Tightly Coupled Microprocessors, Various types of Interconnection Networks like Time Shared or Common Bus, Crossbar Switch, Multi-Port Memories etc., Advance processor technology- Design space of processors, Interprocess Communications, RISC and CISC Architecture.

Unit-V

Control Flow and Data Flow Computers: Control Flow and Data Flow Computers, DataFlow Computers, Data Flow Graphs and Languages, Static and Dynamic Data Flow Computers, Systolic Array Architecture, Memory Hierarchy Technology-Inclusion, Coherence & Locality, TLB, paging with segmentation.

Course Outcomes: On successful completion of this course you will be able to:

1. Understand the principles of computer system design
2. Distinguish the various instruction set architectures
3. Understand the operation of performance enhancements such as pipelines, dynamic scheduling, branch prediction, caches, and vector processors
4. Describe modern architectures such as RISC, Super Scalar, VLIW (very large instruction word), multi-core and multi-CPU systems
5. Compare the performance of the existing architectures

Text Books:

1. **V. Carl Hamacher**, Computer Organization, TMH.
2. **John P. Hayes**, Computer Architecture and Organization, TMH.

Reference Books:

1. **Kai Hwang** Advanced Computer Architecture, TMH.
2. **David A. Patterson and John l. Hennessy**, Computer Organization and Design, Elsware India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Semester VIII

Course Title: Expert Systems **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-822 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The aim of the subject is to provide basic and necessary information about the Expert Systems.

1. To understand the role of expert system in transferring the knowledge of a human expert into an intelligent program that can be used to solve problems or give advice.
2. To understand how knowledge can be added to the expert system
3. To understand various tolls for creating expert system

Unit-I

Expert Systems: Definitions Types, Components of an Expert System, Expert System Shells, Architecture for Knowledge Based Systems, Operational Expert Systems, Development Process.

Unit-II

Knowledge Representation Techniques: Logic, Frames, Semantic Nets, etc.

Unit-III

Natural Language Processing: Basic Parsing Techniques, Types of Learning, Inductive Bearing, Explanation Based Learning, Neural Based Learning, Game Playing Examples.

Unit-IV

Planning and Explanation in Expert System: Neural Expert System, Fuzzy Expert System and Real Time Expert Systems.

Unit-V

Implementation Tools: Prolog & Expert System Shell Expert Sys, Etc., Study of Existing Expert Systems: TEIRESIAS, AMycin& AM.

Course Outcomes: After completing this course, the student should be able to:

1. Apply the methodology to transfer human knowledge into an expert system
2. Apply knowledge representation and Design a knowledge base
3. Understand Natural language processing tools and techniques
4. Understand planning and explanation in expert system
5. Evaluate Expert System tools

Text Books:

1. **Patterson**, Introduction to AI Expert System, PHI, 2001.
2. **Jackson**, Building Expert System, John Wiley, 2000.

Reference Books:

1. **Joseph C Giarratano**, Introduction to Expert System: Principles and Programming,Vikas Publications, 3rd Edition, 1998.
2. **Peter Jackson**, Introduction to Expert System, Addison Wesley, 1998.

Note for paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Semester VIII

Course Title: Neural Networks **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-823 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The principal objective of this subject is to introduce students to neural networksand fuzzy theory from an engineering perspective

Unit-I

Introduction: Historical Perspective, Basic Neurobiology, Why Artificial Networks? Network Architectures, the Tasks Neural Networks Can Perform, Characteristics of Neural Networks

Unit-II

Basic Neuron Models: Mcculloch-Pitts Model, Radial Basis Function Model, etc, Learning Algorithms. Matlab Simulation Exercises.

Unit-III

Basic Neural Network Models: The Hebbian Hypothesis. Single-Layered Neural Networks, Multilayer Perceptron, Nearest Neighbor Based Multilayer Perceptron, Training of Artificial Neural Networks

Unit-IV

Basic Learning Algorithms: Supervised Learning, Constructive Algorithms, Single-Hidden Layer Algorithms. The Upstart Algorithm. The Cascade Correlation Algorithm. Neural Networks and Temporal Sequences. Sequence Recognition. Sequence Generation. Unsupervised Learning. Competitive Learning. The Back Propagation Algorithm, Self-Organization Learning, Winner-Take-All Competitive Learning, Evolutionary Learning.

Unit-V

Applications: Character Recognition, Signal Restoration, Pattern Recognition. Matlab Simulation Exercises.

Course Outcomes: At the end of the course, students should be able to understand and appreciate:

1. The role of neural networks in engineering, artificial intelligence, and other areas.
2. Understanding of basic neural network
3. Understanding of the concepts and techniques of neural networks through the study of the mostimportant neural network models.
4. Able to evaluate whether neural networks are appropriate to a particular application.
5. Able to apply neural networks to particular applications, and to know what steps to take to improveperformance.

Text Books:

1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS PublishingCompany,(2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.

Reference Books:

1. **Valluru Rao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co*(1998)*
2. **Freeman**, Neural Networks, Pearson Publication (2003).
3. **Rajasekaran & Pai**, Genetic Algorithms; Synthesis and applications, Prentice Hall of India (2004).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Research Methodology **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-824 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The student should be able to

1. To introduce various testing techniques along with software production.
2. To introduce the concepts of Software bugs and its impact.

Unit-I

Introduction: Meaning of research, Objectives of research, Motivation in research,Types of research, Research approaches, Research methods versus methodology ,Research and scientific method ,Research Process ,Criteria of Good Research, Problems Encountered by Researchers .

Unit-II

Research Problem: What is a research problem, selecting the problem, Necessity of defining the problem, Technique involved in defining a problem.

Unit-III

Research Design: Meaning of research design, Need for research design, Features of a good design, Different research designs basic principles of experimental designs, before-and-after without control design, after-only with control design, completely randomized design.

Unit-IV

Methods of Data Collection: Collection of primary data, Observation method, Interview method, Collection of data through questionnaires, Collection of data through schedules, Difference between questionnaires and schedules, some other methods of data collection.

Unit-V

Report Writing: Meaning of interpretation, why interpretation is essential, Technique of interpretation, Precautions in interpretation, Significance of report writing, Different steps in writing report, layout of the research report

Course Outcomes: At the end of the course the students will be able to

1. Understand some basic concepts of research and its methodologies.
2. Identify appropriate topics.
3. Select and define appropriate research problem and parameters.
4. Understand the various method of data collection.
5. Understand the Importance of report writing.

Text Books:

1. **Garg, B.L., Karadia, R., Agarwal, F. and Agarwal**, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. **Kothari, C.R**., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3. **Sinha, S.C. and Dhiman, A.K**., 2002. Research Methodology, Ess Ess Publications. 2 vol.

Reference Books:

1. **Trochim, W.M.K**., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
2. **Wadehra, B.L**. 2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Software Project Management **Max Marks: 100 Credits: 03[3-0-0]**

Course Code: PEC-CSE-825 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the subject is to impart an understanding of software projectmanagement.

Unit-I

Introduction and Software Project Planning: Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

Unit-II

Project Organization and Scheduling: Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

Unit-III

Project Monitoring and Control: Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking,Software Reviews, Types of Review: Inspections, Desk- checks, Walkthroughs, Code Reviews, Pair Programming.

Unit-IV

Software Quality Assurance and Testing: Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Clean-room process.

Unit-V

Project Management and Project Management Tools: Software Configuration Management Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools,MS-Project.

Course Outcomes:

1. To have an understanding of how Software Project Management is done.
2. How to Build the project schedules.
3. Understand how budgeting is done.
4. How to assure quality in a software through testing.
5. To have understanding of Planning and Scheduling Tools.

Text Books\ Reference Books:

1. **M. Cotterell,** Software Project Management, Tata McGraw-Hill Publication.
2. **Royce,** Software Project Management, Pearson Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Professional Electives VI Courses (Code: PEC –CSE-826 to PEC –CSE-831)

CODE	SUBJECT	CODE	SUBJECT
PEC –CSE-826	Software Testing	PEC –CSE-829	Deep Learning
PEC –CSE-827	Distributed Computing	PEC –CSE-830	Bio-Metrics and Network Security
PEC –CSE-828	Natural Language Processing	PEC –CSE-831	Design Patterns

Semester VIII

Course Title: Software Testing **Max Marks: 100, Credits: 03[3-0-0]**

Course Code: PEC-CSE-826 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The student should be able

1. To introduce the basics and necessity of Software testing.
2. To introduce various testing techniques along with software production.
3. To introduce the concepts of Software bugs and its impact.

Unit-I

Introduction: Definition of software testing, purpose of testing, basic terminology related to software testing, Phases of software project, Quality, Quality assurance, Quality control, Verification,validation,Life Cycle Models -The V Model,water fall model and Comparison of Various Life Cycle Models

Unit-II

Fundamentals of Software Testing: Testing strategies and techniques-structural vs functional testing, static vs dynamics testing, manual vs automated testing. Role of software tester -task of software tester,qualities of a software tester. Software testing axioms.

Unit-III

Testing: Level of testing- (Unit testing, Integration testing, system testing, Acceptance testing) White Box Testing -(static testing and structural testing),Black Box Testing

Unit-IV

Test Planning: Test planning process, goals, components of test plan, test phases, test strategy, resource requirements, test cases - IEEE 829 standard - to write a test plan, test procedure/ script

Unit-V

Test Automation: Software test automation, skill needed for automation, need for automation testing, test tools, benefits of automation testing - challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

Course Outcomes: At the end of the course the students will be able to

1. Understand the various models.
2. Understand the various testing strategies
3. Understand the testing levels.
4. Prepare test planning based on the document.
5. Develop and validate a test plan, use of automatic testing tools.

Text Books:

1. **GlenfordJ Myers, Tom Badgett, Corey Sandler,** "The Art of Software Testing",3rd edition, John Wiley & Sons publication, 2012.
2. **Srinivasan Desikan, Gopalaswamy Ramesh**, "Software testing- Principles and Practices", Pearson education, 2009.

Reference Books:

1. **Ron Patton**, "Software Testing", second edition, Pearson education, 2009.
2. **Boris Beizer**, "Software testing techniques", Dream Tech Press, 2009.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Distributed Computing **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-827 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The objective of this course is to introduce students to the fundamentals and techniques of distributed computing. Students are expected to develop distributed applications using latest technologies.

Unit-I

Introduction: Introduction to Distributed System; Goals, Hardware Concepts, Software Concepts and Client-Server Model. Examples of Distributed Systems.

Unit-II

Process and Interprocess Communication: Communication: Layered Protocols, Remote Procedures Call, Remote Object Invocation, Message-Oriented Communication. Processes: Threads, Code Migration, Software Agent.

Unit-III

Naming & Synchronization: Naming: Naming Entities, Locating Mobile Entities, Removing Un-Referenced Entities. Synchronization: Election Algorithms, Mutual Exclusion, Distributed Transactions.

Unit-IV

Consistency and Replication: Consistency and Replication: Introduction, Data Centric Consistency Models, Client Centric Consistency Models, And Distribution Protocols. Fault Tolerance; Introduction, Process Resilience, Reliable Group Communication. Distributed Commit.

Unit-V

Security Policies: Security: Introduction, Secure Channels, Access Control, And Security Management.

Course Outcomes:

At the end of this course, the student will able to do following:

1. Study software components of distributed computing systems.
2. Know about the communication and interconnection architecture of multiple computer systems.
3. Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
4. Understanding of networks & protocols, mobile & wireless computing and their applications to real world problems.
5. To be familiar with the design, implementation and security issues of distributed system.

Text Book:

1. **Tannenbaum A. S.**, "Distributed Systems: Principles and Paradigms", PHI.
2. **M. Singhal& N. Shivaratri**, Advanced Concepts in Operating Systems, TMH.

Reference Book:

1. **G. Coulouris, J. Dollimore, and T. Kindberg**, Distributed Systems: Conceptsand Design, Pearson Education.
2. **Ajay D kshemkalyani and MukeshSinghal,** Distributed Computing: Principles, Algorithms, and Systems, South Asian Edition.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Natural Language Processing **Max Marks: 100,Credits: 03[3-0-0]**
Course Code: PEC-CSE-828 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The main objectives of this course are:

1. To introduce the fundamental concepts and techniques of NLP
2. To examine NLP models and algorithms using both traditional symbolic and the more recent statistical approaches.
3. To study the phonology, morphology, syntax and semantic of language using both linguistic and algorithmic perspective.
4. To study computational properties of natural languages and of the algorithms used to process them, as well as the match between grammar formalisms and the linguistic data that needs to be covered.

Unit -1

Introduction to Natural Language Processing, Natural Languages and Formal Languages, Regular Expressions and Automata, Words and their Analysis. Tokenization, Stemming, Part of Speech (POS) tagging, Morphological Analysis.

Unit-II

N-Grams and Part of Speech Tagging :N-grams Models of Syntax, Counting Words in Corpora, Simple (Unsmoothed) N-grams, Smoothing, Backoff, Part of speech Tagging, Rule-Based Part of Speech Tagging, Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models and Conditional Random Fields

Unit-III

Syntax Parsing: Context-Free Grammars for English Syntax, Context-Free Rules and Trees, Sentence, Level Constructions, Agreement, Sub Categorization, Parsing with Context-Free Grammars, Top-down Parsing, Bottom-Up Parsing, Feature Structures, Probabilistic Context-Free Grammars.

Unit-IV

SemanticAnalysis: Representing Meaning, Meaning Structure of Language, First Order Predicate Calculus, R epresenting Linguistically Relevant Concepts, Syntax-Driven Semantic Analysis, Word-Sense disambiguation, Supervised – Dictionary based and Unsupervised Approaches – Machine Learning.

Unit-V

Applications of Natural Language Processing: Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment-phrase-based translation.

Course Outcomes: After completing this course, the student should be able to:

1. Understand the basic concepts of language for processing
2. Implement different data models for language processing
3. Understand parsing techniques related to English language
4. Process and analyse the language semantically
5. Understand the application of NLP

Text Books:

1. **Daniel Jurafsky and James H. Martin,** Speech and Language Processing (2nd Edition), Prentice Hall; Second Edition, 2008
2. **Christopher D. Manning and HinrichSchuetze,**Foundations of Statistical Natural Language Processing, MIT Press, 1999
3. **Steven Bird, Ewan Klein and Edward Loper**, Natural Language Processing with Python, O'Reilly Media; 1 edition, 2009
4. **Roland R. Hausser**, Foundations of Computational Linguistics: Human- Computer Communication in Natural Language, Paperback, MIT Press, 2011

Reference Books:

1. **Pierre M. Nugues**, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special Consideration of English, French, and German (Cognitive Technologies) Softcover reprint, 2010
2. **James** Allen and Addison Wesley, Natural Language Understanding,; 2 edition 1994

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Deep Learning **Max Marks: 100, Credits: 03[3-0-0]**
Course Code: PEC-CSE-829 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: This course will explore applications and theory relevant to problem solving using deep learning. By the end of this course, students will gain intuition about how to apply various techniques judiciously and how to evaluate success. Students will also gain deeper insight into why certain techniques may work or fail for certain kinds of problems.

Unit-I

Machine Learning Basics: Learning Algorithms, Capacity, Overfitting and Underfitting, Hyperparameters and Validation Sets, Estimators, Bias and Variance. Maximum Likelihood Estimation. Bayesian Statistics. Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Descent.Building a Machine LearningAlgorithm.Challenges Motivating Deep Learning.

Unit-II

Introduction to Deep Learning: Neural Network Basics, feedback and Feed forward Neural networks, Shallow Neural Network, Deep Neural Networks Convolution Neural Networks, Gradient descent and the back propagation algorithm. Unit saturation, vanishing gradient problem, and ways to mitigate it.RelU Heuristics for avoiding bad local minima.Heuristics for faster training.Nestors accelerated gradient descent. Regularization. Dropout.

Unit-III

Convolutional Neural Networks: Architectures, convolution / pooling layers, Recurrent Neural Networks LSTM, GRU, Encoder Decoder architectures.

Unit-IV

Deep Unsupervised Learning: Autoencoders (standard, sparse, denoising, contractive, etc), Variational Autoen coders, Adversarial Generative Networks, Autoencoder and DBM Attention and memory models, Dynamic memory networks

Unit-V

Applications: application of deep learning to computer vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models. Attention models for computer vision tasks.

Course Outcomes: Upon successful completion of the course, students should be ableto:

1. Understand key concepts related to Deep Learning.
2. Derive a simple Feed forward Neural Network (DNN).
3. Understand DNN architecture and parameters.
4. Intuitively understand theory on why DNN works.
5. Be able to compare DNN to other Machine Learning techniques
6. Apply DNN to real-life problems.

Text\Reference Books:

1. **Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville.** "Deep learning." AnMITPress book in preparation. (2015).
2. **Bengio, Yoshua**. "Learning deep architectures for AI." Foundations and trends inMachine Learning 2.1 (2009): 1127.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VIII

Course Title: Bio-Metrics and Network Security **Max Marks: 100 ,Credits: 03[3-0-0]**
Course Code: PEC-CSE-830 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To understand the principles of biometric systems.

Unit I

Introduction:Biometric Fundamentals-Biometric technologies – Biometrics Vs traditional techniques – Characteristics of a good biometric system – Benefits of biometrics – Key biometric processes: verification, identification and biometric matching – Performance measures in biometric systems: FAR, FRR, FTE rate, EER and ATV rate. Introduction of biometric traits and its aim.

Unit II

Physiological Biometrics: Leading technologies: Finger-scan – Facial-scan – Iris- scan – Voice-scan – Hand Scan, Retina Scan - components, working principles, competing technologies, strengths and weaknesses. Selection of suitable biometric. Biometric attributes, zephyr charts, types of multi biometrics. Verifications on multimodal system, normalization strategy, fusion methods, multimodal identification.

Unit III

Automated Biometric System and Behavioral Biometrics: Automated fingerprint identification systems, Leading technologies: Signature-scan, Keystroke scan ,components, working principles, strengths and weaknesses.

Unit IV

Biometric System Security: Biometric system vulnerabilities, circumvention, covert acquisition, quality control, template generation, interoperability data storage. Recognition systems: face, signature, fingerprint, ear, iris, Palm etc.

Unit V

Privacy and Standards In Biometrics: Assessing the Privacy Risks of Biometrics – Designing Privacy-Sympathetic Biometric Systems – Need for standards – different biometric standards.

Course Objectives:

1. To have an understanding of biometric traits
2. To have an understanding of various biometric traits.
3. To have an understanding of automated biometric systems.
4. To have an understanding about how to secure a biometric systems.
5. Understand privacy concerns and how to address them.

Text Books:

1. **SamirNanavati, Michael Thieme, Raj Nanavati,** "Biometrics – Identity Verificationin a
2. **Wiley-dreamtech,** Networked World, India Pvt Ltd, New Delhi, 2003

Reference Books:

1. **John R Vacca,** "Biometric Technologies and Verification Systems", Elsevier Inc,2007
2. **Anil K Jain, Patrick Flynn, Arun A Ross**, "Handbook of Biometrics", Springer,2008

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Semester VIII

Course Title: Design Patterns **Max Marks: 100, Credits: 03[1-0-0]**
Course Code: PEC-CSE-831 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

OBJECTIVES: The student should be able to

1. To understand the common design patterns.
2. To explore the appropriate patterns for design problems.

Unit-I

Introduction: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern.

Unit-II

Analysis a System: Overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.

Unit-III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton.

Introduction to Services and Microservices architecture for patterns.

Unit-IV

Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

Unit-V

The MVC Architecture: Introduction ,the model–view–controller architecture, An alternate view of the MVC architecture, Benefits of the MVC Pattern

Course Outcomes: At the end of the course the students will be able to

1. Understand the basic concepts design pattern.
2. Understand the process of the requirements.
3. Apply creational patterns to solve design problems.
4. Apply structural patterns to solve design problems.
5. Understand the basic concepts of MVC architecture.

Text Books:

1. Design Patterns By Erich Gamma, Pearson Education
2. Design Patterns Explained By Alan Shalloway,Pearson Education..
3. Meta Patterns designed by Wolf gang , Pearson.

Reference Books:

1. Head First Design Patterns By Eric Freeman-Oreilly-spd
2. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
3. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions willbe set from each unit. The student has to attempt five questions selecting at least one questionfrom each unit

SEMESTER-I
List of Courses

Semester-I		
Course Code	**Course Title**	**Credits**
MPR-101	Classical Persian Literature-Prose and Poetry-Level-I	4
MPR-102	Modern Persian literature-Prose and Poetry-Level-I	4
MPR-103	History of Persian Literature-Level-I	4
MPR-104	Applied Persian Grammar	4
MPR-105	Persian prosody	4
MPR-106	Communication skills- level-I	4
	Total credits	**24**

1. 2.

SEMESTER-I

Course Code: MPR-101 **Course Title : Classical Persian Literature-Prose and Poetry-Level-I** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

The following sections only from the book "Nasr-e-Kohan" Vol. I (Ministry of Culture and Arts, Tehran, 1354):

Unit 1: سیاستنامه از نظام الملک طوسی

1.1 Life and works of Nizam-ul-Mulk Tusi
1.2 Literary importance of Siyasatnama
1.3 Text of siyasatnama

Unit 2 چهار مقاله از نظامی عروضی سمرقندی

2.1 life and works of Nizami Aruzi Samarqandi
2.2 The importance of Chaharmaqala
2.3 text

Unit 3: گلستان سعدی از سعدی شیرازی

3.1 Life and works of Saadi
3.2 Literary importance of Gulistan
3.3 Text of Gulistan

Unit 4: ده غزل از حافظ (ردیف الف)

4.1 Life and works of Hafiz Shirazi
4.2 characteristics of hafiz's ghazals
4.3 reading and understanding of his ghazals

Unit 5: ده رباعی از خیام نیشاپوری

(First 10 quatrains from *Rubaiyyat-I Khayyam* edited by Mohammad Ali Foroghi, Intehsrat-I Jawidaan, Iran)

5.1 life and woks of Omar Khayyam
5.2. Themes and subjects of Khayyam's quatrains
5.3 Reading and understanding some of his quatrains

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Books:

- Khanlari, Parwiz Natel, Shahkaarha-i-Adabiyat-e-Farsi: Rustam-o-Sohrab,
- Amir Kabir, Tehran, 1362
- Abdullah, Syed, Adabiyāt-e-Farsi mein Hinduon ka Hissa, Punjab
- University Lahore, 1967.
- Arberry, A.J., Classical Persian Literature, Cambridge University Press.

1. 2. Manzar Alam 3.

Co-ordinator
M.A. Persian Programme
BGSB University, Rajouri

- Asghar, Aftab, Tarikh Navisi-e-Farsi der Hind-o- Pakistan, Lahore, 1985.
- Browne, E.G., A Literary History of Persia (Four Vols.), Cambridge University Press.
- Faruzanfar, Badi-uz-Zamān, Sukhan va Sukhanvarān, Tehran, 1308.
- Ghani, A., A History of Persian Literature at the Mughal Court (Three Vols.)
- Ghani, A, Pre-Mughal Persian Literature.
- Humayunfar, Izzatullah, Duniya-e-Sha"erān, Tehran.
- Nomani, Shibli, Sh"er-ul-Ajam (Five Volumes), Shibli Academy, Azamgarh.
- Rypka, J., History of Iranian Literature, ed. Karl Jahn, Holland, 1968.
- Safa, Zabihullah, Tarikh-e-Adabiyāt der Iran (Six Volumes), Amir Kabir, Tehran.
- Shafaq, Raza Zadeh, Tarikh-e-Adabiyat-I Iran.
- Shirāni, Mahmud, Tanqid-e-She"r-ul-Ajam
- Tarikh-e Adabiyyat-e-Musalmanān-e-Pakistan-o-Hind (Vol. III, IV & V).
- Grant, Damian, Realism, Tr. By Hasan Afshar, pub. By NashreMatkaz, Tehran, 1375
- Shirazi Hafiz, Diwan-e Hafiz
- Omar Khayyam, Rubaiyat-e Omar Khayyam
- Dashti Ali, Dami ba Khayyam
- Subhani Taufiq, Nigahi Br Adab-e Adab-e Farsi dar Hind.

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SEMESTER-I

Course Code: MPR-102 **Course Title: Modern Persian literature-Prose and Poetry-Level-I** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks :100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

MPR-102: Modern Persian literature-Prose and Poetry-Level-I

Unit-I

The following Lessons only from the Book "Adabiyate Dauraye Bidari va Moa'ser" compiled by Dr. Mohammad Est`elami 2535:

Unit 1: علی اکبر دهخدا

1.1 Life and works of Dehkhuda

1.2 Charand-o-Parand and Modern Persian Literature

1.3 His contribution to modernization of Persia literature

Unit 2: محمد علی جمالزاده

2.1 Life and works of Jamalzadeh

2.2 short story writing in Persian literature

2.3 Yakibud Yakinabud

Unit 3: صادق هدایت

3.1 Life and works of Sadiq Hidayat

3.2 Buf-e Kur

3.3 literary importance of Buf-e Kur

The following Lessons only from the Book "Adabiyate Dauraye Bidari va Moa"ser" compiled by Dr. Mohammad Est`elami 2535:

Unit 4:نیما یوشیج و مهدی اخوان ثالث

4.1 life and works of Nima Yuhij

4.2 Life and works of Akhawan-e Sales

4.3 Sher-e Nau/ Sher-e Nimayi

Unit 5: فروغ فرخزاد و بهار

5.1 Life and works of Forogh Faruukhzad

5.2 Life and works of Malik Shuara Bahar

5.3 Characteristics of their poetry

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Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- A'bedini, Hasan Mir, Sad Saal-I Dastan Nevisi der Iran Vol. I, II & III, 1367 & 1377.
- Akbari, Manuchehr, Naqd-o-Tahlil-e-Adabiyat-Inqelab-e Islami, Vol. I, Tehran, 1371.
- AryanPour, Yahya, Az Saba ta Nima, Vol. I & II, Tehran, 1374.
- AryanPour, Yahya, Az Nima ta Roozgar-e-Ma, Vol. III. Tehran, 1387
- Browne, E.G., Press and Poetry in Modern Iran, Cambridge University Press. London, 1928
- Estel`ami, Md, BarRasi-e-Adabiyat-e-Moa"sir, Amir Kabir, Tehran.
- Estel`ami, Md. Adabiyate dauraye Bidari va Moa"ser, Tehran
- Hamidi, Mehdi, Daryae Gauhar, Vol. I, Amir Kabir, Tehran, 1339
- Hasanali, Kaoo"s, Gunehae Nau A"wari der Sh"er-e-Moa"sir-e-Iran, Tehran, 1383.
- Ishaq, Mohammad, Sukhanwara"n-e-Iran der A"sr-e-Hazir, Delhi, 1355.
- Kamshad, H, Modern Persian Prose, Cambridge University Press.
- Kadkani, Md. Raza Shafi"ee, Adwar-e-She"r-e-Farsi, Tehran, 1380.
- Langrudi, Shams, Tarikh-e-Tahlil-e-She"r-e-Nau, Tehran, 1377.
- Hosseinpour Chaffee, Ali, Jaryanha-e-She"ri-e-Moa"sir-e-Farsi, Amir Kabir, Tehran, 1384.
- Qasemi, S.H., Jadid Farsi Sha"eri, Delhi.
- Yahaqi, Mohammad. Jafar, Joy-e-bar-e-Lehzeha, Tehran, 1381.
- Zarrinkoub, Abdul Husain, She"r-e-Bedurugh, She"r-e Benaqab, Tehran.
- Lilian R. Furst and Pete, Naturalism, Tr. By Hasan Afshar, pub. By Nashre Matkaz,Tehran, 1375
- Payandeh,Husain, Dastane Kutah dar Iran, (Realistic and Naturalistic Stories) Intasharate Nilufar, Tehran,1390
- Bahar, Muhammad Taqi, Sabk Shanasi, Amir Kabir, Tehran, 1981

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1. 2. 4

Semester I

Course Code: MPR-103 **Course Title : History of Persian Literature-Level-I** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-103: History of Persian Literature-Level-I

Unit-I:History of Persian language and literature during the Pre-Islamic Period

1.1 Old Persian
1.2 Middle Persian
1.3 Modern Persian

Unit 2:History of Persian Literature during Tahirid and Saffarid periods

2.1 Persian Literature during Tahirid Period
2.2 Persian Literature during Saffarid period
2.3 Socio-Cultural History of Iran during Tahirid and Saffarid Periods

Unit 3:History of Persian Literature during Samanid Period

3.1 Socio-Cultural History of Iran during Samanid Period
3.2 Literary History of Iran during Samanid Period
3.3 Life and works of prominent poets and authors of the period

Unit 4: History of Persian Literature during Ghaznavid Period

4.1 Socio-Cultural History of Iran during Ghaznavid Period
4.2 Literary History of Iran during Ghaznavid Period
4.3 Life and works of prominent poets and authors of Ghaznavid period

Unit 5: History of Persian Literature during Seljuq Period

5.1 Socio-Cultural History of Iran during Seljuq Period
5.2 Literary History of Iran during Seljuq Period
5.3 Life and works of prominent poets and authors of Seljuq period

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- Arberry, A.J., Classical Persian Literature, Cambridge University Press.
- Browne, E.G., A Literary History of Persia (Four Vols.), Cambridge University Press.
- Rypka, J., History of Iranian Literature, ed. Karl Jahn, Holland, 1968.
- Safa, Zabihullah, Tarikh-e-Adabiyāt der Iran (Six Volumes), Amir Kabir, Tehran.
- Shafaq, Raza Zadeh, Tarikh-e-Adabiyat-I Iran.

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SEMESTER-I

Course Code: MPR-104 **Course : Applied Persian Grammar** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-104: Applied Persian Grammar

Unit 1: Applied Grammar

1.1 Past, Present and future tenses
1.2 Singular, Plural, Definite indefinite, Adverb, Adjective, Genitive etc.
1.3 Pronouns, Prepositions, conjunctions, degrees etc.

Unit 2: Translation from English to Persian

2.1 News translation
2.2 Literary text translation
2.3 historical text translation

Unit 3: Translation from Persian to English

3.1 News translation
3.2 Literary text translation
3.3 historical text translation

Unit 4: Essay writing in Persian

4.1 Essay on national issues
4.2 Essay on international issues
4.3 Essay on literary/prominent figures

Unit 5: Vocabulary building

5.1Social cultural and political
5.2 Judicial and defense
5.3 Other relevant technical terminologies

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Books prescribed:

- Jones, Sir William, A Grammar of the Persian Language, London, 1828.
- Forbes, Duncan, A Grammar of the Persian Language, London, 1861.
- Zarghamian, Mehdi, Daura-e-Amuzish-e-Zaban-e-Farsi, Tehran, 1374
- Moghaddam, Ahmad Saffar, A general course in Persian, Tehran, 1999
- Sadeghian, Jalil Banan, Persian for Non-Natives, Tehran, 1377
- Samareh, Yadollah, Azfa series1-4, Tehran, 1998-99
- Talib, N. L. Kaul, An applied Persian Grammar and Translation, Lahore, 1939
- Purnamdariyan, Taqi, Persian lessons for foreigners, Tehran, 1977
- Khanlari, Parviz Natel, Dastur e zaban e Farsi.
- Kumar Rajinder, Elementary Persian Grammar By RajinderKumar

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SEMESTER-I

Course Code: MPR-105 **Course Title : Persian prosody** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-105: Persian prosody

Unit 1: Brief history of *Ilm-I Aruz*

1.1 Brief history of prosody

1.2 Evolution of prosody

1.3 Relevance of Prosody

Unit 2:سبب، وتد، زحاف، ارکان عشره

2.1 sabab and watad and their kinds

2.2 Zihaf and its kinds

2.3 Ten rukn of Prosody

Unit 3: Meter

3.1 هزج، رمل،

3.2 رجز، کامل،

3.3 وافر متقارب، متدارک بحر طویل وغیره

Unit 4: تقطیع

4.1 Taqtee of couplets

4.2 Taqtee of the poetry of greats of Persian poetry

4.3 Reading of poetry and its taqtee

Unit 5: صنایع ادبی

5.1 brief introduction to the figures of speech

5.2 figures of speech

5.3 application and identification of figures of speech

<u>Note for Paper Setting</u>:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Books prescribed:

- Khanlari, Dr. Zahra; Farhang-e-Adabiyat-e-Farsi-e-Dari, Bunyad-eFarhang-e-Iran, Iran-1375
- Farrughui, Mohd. Husain; Ilm-e-Badi", Bunyad-e-Farhang-e-Iran, Tehran-1370.
- Razi, Shams Qais (ed. Mudarris Rizwi), Al Mo"jam Fi Ma"eer-e-Asha"rul-,,Ajam, Danishgah-e-Tehran-1378.

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1. [signature] 2. Manzar Ali 3. [signature] 4 Rizwan Ali

SEMESTER-I

Course Code: MPR-106 **Course Title : Communication skills- level-I** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-106: Communication skills- level-I

Unit 1: Essay writing in Persian on national and international issues

1.1 Essay on national issues

1.2 Essay on international issues

1.3 Essay on literary/prominent figures

Unit 2: Translations of Literary, Scientific, Technical and Judicial from English into Persian

2.1 Literary and Scientific: College, Faculty, Department, Teacher, Professor, Vice Chancellor, Head of the Department, Students, Classroom, and Homework etc.

2.2 Technical: library, Laboratory, hostel, train, airplane, airport, taxi, bus, ticket.

2.3 Judicial: court, lawyer, appeal, judge, supreme court, chief justice, judgment, defense lawyer etc.

Unit 3: Translations of Defense, Political and International Terminologies from English into Persian

3.1 Defense terminologies: army, uniform, police, constable, complaint, jail, parole, air force, navy force, etc.

3.2 Political: parliament, PM, Minister, member of Parliament, upper house, lower house, speaker, election commission of India, Governor, leader of opposition, parliamentary election etc.

3.3 Other International Terminologies used in papers and literary texts: Central Asian region, Indian subcontinent, Oil Producing countries, agreement, MoU, bilateral ties, international relations, Indo-Iran relations, cultural relations, regional cooperation etc.

Unit 4: Translation of Texts & Passages from Persian into English.

4.1 News translation from international and national papers

4.2 Literary text translation

4.3 historical text translation

Unit 5: Translation of Texts & Passages from English into Persian.

5.1 News translation from international and national papers

5.2 Literary text translation

5.3 historical text translation

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Books prescribed:

- Kumar Rajinder; Elementary Persian Gramamr Delhi2016
- Kitabat e Farsi (Baraie Clashai Muaqaddamti) Department of PersianDelhi
- Khanlari, P Netel, Persian Grammar NewDelhi
- Zarghami Mehdi, Daura e Amauzish e Zaban E FarsiTeharn
- Moghaddam Ahmed Saffar, A general Course in PersianTehran.
- Saeed, Mr. Ahmad, Lessons in Persian, Delhi

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1. 2. Manzar Ali 3. 4 Rizwan Ali

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SEMESTER-II
List of Courses

Semester-II		
MPR-201	Classical Persian Literature-Prose and poetry-Level-II	4
MPR-202	Modern Persian literature-Prose and Poetry-Level –II	4
MPR-203	History of Persian Literature-Level-II	4
MPR-204	Communication skills- level-II	4
MPR-205	Study of any one of the selected Modern Persian poets	
CHOICE BASED OPEN COURSE (CBCS) any one of the following		
Math-215	Mathematical Tools for real world Problems	4
I T. 216	Soft Skills in Information Technology	4
Comp. 217	Computer Applications and Operations	4
Bio-218	Fundamentals of Bio Technology	4
Bot-219	Mysteries of Green plants	4
Bot-220	Botany in Rural Developments	4
Zol-221	Nutrition, Health and hygiene	4
ARB-222	Fundamentals of Arabic Language	4
Eng-223	Applied English	4
Edu-224	Higher Education	4
Eco-225	Principles of Banking	4
HT-226	Basic of Tourism and Travel Agencies	4
HT-227	Tourism Resources of J&K	4
MGT-228	Business Communication and Soft Skills	4
EDU-229	Instructional Technology	4
UR-230	Fundamentals of Urdu Language and Literature	4
PER-231	**Fundamentals of Persian Language** (for non Persian students)	4

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SEMESTER-II

Course Code: MPR-201 **Course Title: Classical Persian Literature-Prose and Poetry-Level-II** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-201: Classical Persian Literature-Prose and Poetry-Level-II

The following sections from Nasre Kohan:

Unit- I: Aiyn-eAkbari

1.1 Reading and understanding of the Text
1.2 Life and works of Abul Fazl
1.3 Literary and historical importance of Aiyn-e Akbari

Unit 2: Kalila waDimna

2.1 Reading and understanding of the Text
2.2 Life and works of Abu'l-Ma'ali Nasrallah
2.3 Literary and historical importance of Kalila wa Dimna

Unit 3: Tarikh-e Firozshahi

3.1 Text
3.2 Life and works of Ziauddin Barani
3.3 Literary and historical importance of Tarikh-e Firozshahi

Unit 4: Story of *Rostam o Sohrab* from Shahnamah

4.1 Text
4.2 Life and works of Firdowsi
4.3 Literary and historical importance of Shahnama

Unit 5: Aiwan-I Madaen by Khaqani

هان ای دل عبرت بین از دیده نظر کن هان
الی
خاقانی! از این درگه دریوزهی عبرت کن،

5.1 Text
5.2 life and works of Khaqani
5.3 The characteristics of the poetry of Khaqani

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Prescribed Book

- Nasr e Kohan Vol 1 Ministry of Culture and Arts,Tehran
- Shahnamah by Firdowsi
- Diwan of Khaqani.

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SEMESTER-II

Course Code: MPR-202 **Course Title : Modern Persian literature-Prose and Poetry-Level -II** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-202: Modern Persian literature-Prose and Poetry-Level -II

The following Lessons only from the Book "Darya-e-Gauhar, Vol. I (گوهر دریای اول جلد) (compiled by Dr. Mahdi Hamidi, Tehran, 1343:

Unit 1:محمد حجازی

1.1 Textمجلس عیادت

1.2 Life and works of Mohammad Hijazi

1.3 Mohammad Hijazi and Short story writing in Persian

Unit 2: علی دشتی

2.1 Text مرگ مادر

2.2 Life and works of Ali Dashti

2.3 Ali Dashti and Short story writing in Persian

Unit 3: سعید نفیسی و صادق هدایت

3.1 Text عدل واذان مغرب

3.2 Life and works of Saeed Nafisi

3.3 Life and works of Sadiq Hidayat

The following Lessons only from the Book "Darya-e-Gauhar,Vol.III(دریای سوم جلد گوهر (compiled by Dr. Mahdi Hamidi, Tehran, 1341:

Unit 4ادیب پیشاوری و رشید یاسمی

4.1 Text ماهی هوسطلعت دوست و

4.2 Life and works of Adeeb Pishawari

4.3 Life and works of Rashid Yasemi

Unit 5: سیمین بهبهانی ونیما یوشیج

5.1 Text طاهر و کنیزک، و قو شراب نور و غرور

5.2 Life and works of Simin Behbahani

5.3 Life and works of Nima Yushij

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

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Suggested Readings:

- Darya-e-Gauhar, Vol. I, compiled by Dr. Mahdi Hamidi, Tehran,1343.
- Darya-e-Gauhar, Vol. II, compiled by Dr. Mahdi Hamidi, Tehran,1343.
- A"bedini, Hasan Mir, Sad Saal-I Dastan Nevisi der Iran Vol. I, II & III, 1367 & 1377.
- Akbari, Manuchehr, Naqd-o-Tahlil-e-Adabiyat-Inqelab-e Islami, Vol. I, Tehran, 1371.
- AryanPour, Yahya, Az Saba ta Nima, Vol. I & II, Tehran, 1374.
- AryanPour, Yahya, Az Nima ta Roozgar-e-Ma; Vol. III. Tehran, 1387
- Browne, E.G., Press and Poetry in Modern Iran, Cambridge University Press. London, 1928
- Estel`ami, Md, BarRasi-e-Adabiyat-e-Moa"sir, Amir Kabir, Tehran.
- Estel`ami, Md. Adabiyate dauraye Bidari va Moa"ser, Tehran
- Hamidi, Mehdi, Daryae Gauhar, Vol. I, Amir Kabir, Tehran, 1339
- Hasanali, Kaoo"s, Gunehae Nau A"wari der Sh"er-e-Moa"sir-e-Iran, Tehran, 1383.
- Ishaq, Mohammad, Sukhanwara"n-e-Iran der A"sr-e-Hazir, Delhi, 1355.
- Kamshad, H, Modern Persian Prose, Cambridge University Press.
- Kadkani, Md. Raza Shafi"ee, Adwar-e-She"r-e-Farsi, Tehran, 1380.
- Langrudi, Shams, Tarikh-e-Tahlil-e-She"r-e-Nau, Tehran, 1377.
- Hosseinpour Chaffee, Ali, Jaryanha-e-She"ri-e-Moa"sir-e-Farsi, Amir Kabir, Tehran, 1384.
- Qasemi, S.H., Jadid Farsi Sha"eri, Delhi.
- Yahaqi, Mohammad. Jafar, Joy-e-bar-e-Lehzeha, Tehran, 1381.

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1. 2. Manzar Ala 4. Rizwan

SEMESTER-II

Course Code: MPR-203 **Course Title : History of Persian Literature-Level-II** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-203: History of Persian Literature-Level-II

Unit 1: Khwarazmshahi period

1.1 Socio-Cultural History of Iran during Khwarazmshahi Period
1.2 Literary History of Iran during Khwarazmshahi Period
1.3 Life and works of prominent poets and authors of the period(Rashid Watwat, Nizami, Khaqani, Ghazali, Attar)

Unit 2: Mughal Period in Iran

2.1 Socio-Cultural History of Iran during Mughal Period
1.2 Literary History of Iran during Mughal Period
1.3 Life and works of prominent poets and authors of the period (Saadi, hafiz, Rumi, Auhadi, Khwaju kirmani, Jami)

Unit 3: Safavid Period

3.1 Socio-Cultural History of Iran during Safavid Period
3.2 Literary History of Iran during Safavid Period
3.3 Life and works of prominent poets and authors of the period (Saib, Urfi, Mohtasham Kashani, naziri, Talib Amuli, Kalim Hamadani, Zahuri Turshizi)

Unit 4: Afsharid and Zand periods

4.1 Socio-Cultural History of Iran during Afsharid and Zand periods
4.2 Literary History of Iran during Afsharid and Zand periods
4.3 Life and works of prominent poets and authors of Afsharid and Zand periods (Hatis Isfahani, Ali Hazin, Lutf Ali Beg)

Unit 5: Qajarand Pahlavi Periods

5.1 Socio-Cultural History of Iran during Qajar and Pahlavi periods
5.2 Literary History of Iran during Qajar and Pahlavi periods
5.3 Life and works of prominent poets and authors of Qajar and Pahlavi periods (Wisal Shirazi, Qaani, Sahab Isfanai, Saba, Nima, Akhwan Salis, Jamalzadeh, Sadeq Hidayat, Buzurg Alavi, Forogh Farrukhzad)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Books:

- Browne, E.G., A Literary History of Persia (Four Vols.), Cambridge University Press.
- Rypka, J., History of Iranian Literature, ed. Karl Jahn, Holland, 1968.
- Safa, Zabihullah, Tarikh-e-Adabiyāt der Iran (Six Volumes), Amir Kabir, Tehran.

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- Shafaq, Raza Zadeh, Tarikh-e-Adabiyat-I Iran
- Abedini, Hasan Mir; Hashtad Saal Dastan Kotah-e Irani, 2nd edition, Tehran, 1385.
- Abedini, Hasan Mir; Sad Saal Dastan-Nevisi der Iran, Vol. I, II & III, 1367 & 1377.
- Akbar, Razia; Iran mein Jadid Farsi Adab ke Pachas Saal (1900-1950), Hyderabad, 1991.
- Akbari, Manuchehr; Naqd-o-Tahlil-e Adabiyat-Inqelab-e Islami, Vol. I, Tehran, 1371.
- AryanPour, Yahya; Az Saba ta Nima, Vol. I & II, Tehran, 1374.
- AryanPour, Yahya; AzNima ta Roozgar-e Ma, Vol. III.
- Asghar Ilahi, Safdar TaqiZadeh; Dastanhay-e Kutah-e Iran va Jahan, 2nd Edition, Intasharat-e Tus, Tehran, 1377.
- Browne, E.G.; Prose and Poetry in Modern Iran, Cambridge UniversityPress

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SEMESTER-II

Course Code: MPR-204 **Course Title : Communication skills- level-II** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-204: Communication skills- level-II

Unit 1: Essay writing in Persian on national and international issues

1.1 Essay on national issues

1.2 Essay on international issues

1.3 Essay on literary/prominent figures

Unit 2: Translations of Literary, Scientific, Technical and Judicialfrom English into Persian

2.1 Literary and Scientific: Aphorism, Exposition, Meter, Satire, Theme, Symbol, Allegory, Irony, Imagery, Simile, Allusion, Hyperbole, Metaphor, Personification, Alliteration; Astronomy, Astrophysics, Atom, Beaker, Botany, Biochemistry, Biology, Cell, Climate, Climatologist, Data, Datum, Element, Energy.

2.2 Technical: modernization, missile, bomb. Tank, machine gun, uranium, space station. Orbit.

2.3 Judicial: Affidavit, Appeal, Arbitration, Attestation, Bench, Cause List, Cognisable offense, Contempt of Court, Intervenor, Stay Order, Issue Notice, Subjudice, Suo Motu, Petition.

Unit 3: Translations of Defense, Political and International Terminologies from English into Persian

3.1 Defense terminologies: About Face, Awol, Bird, Black on, Cadence, DFAC, Embed, IRB, JOE, BSF, CRPF, Base of Fire, Big Voice, Cop, Cover, Hardened side, IDF (Indirect Fire), IED (Improvised Explosive Device).

3.2 Political: Spoiled Ballots, Tactical Voting, Prorogation, Proxy or e-postal Ballot System, Hung Parliament, Whip, Silent Majority, Exit Poll, Swing Voters, Redistricting, Confidence and Supply, Counting.

3.3 Other International Terminologies used in papers and literary texts: WHO, International trade, Universal, United Nation, WTO, IMF, ILO, ISO, UNESCO, ICAC, ITU, FAO, NATO, IOM.

Unit 4: Translation of Texts & Passages from Persian into English.

4.1 News translation from international and national papers

4.2 Literary text translation

4.3 historical text translation

Unit 5: Translation of Texts & Passages from English into Persian.

5.1 News translation from international and national papers

5.2 Literary text translation

5.3 historical text translation

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

1. 2. Manzar Ata 3. 4 Rizwan

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Suggested readings:

- Kumar Rajinder; Elementary Persian Gramamr Delhi2016
- Khanlari, P Natel, Persian Grammar NewDelhi
- Zarghami Mehdi, Daura e Amauzish e Zaban E FarsiTeharn
- Moghaddam Ahmed Saffar, A general Course in PersianTehran.
- Saeed, Mr. Ahmad, Lessons in Persian, Delhi.
- Persian and English newspapers/ journals/magazines

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1. 2. 3. 4

SEMESTER-II

Course Code: MPR-205 **Course Title : Study of any one of the selected Modern Persian poets** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR-205: Study of any one of the selected Modern Persian poets
Nima Yushij
The Book: Barguzida-e-Ash'ar-e-Nima Yushij by Siroos Tahbaz

Unit 1
افسانه، قصه رنگ پریده و خونسرد
Unit 2
در خوابگاه مورچگان و مانلی
Unit 3
سایه خود، مرغ آمین و ققنوس
Unit 4
Life and Works of Nima Yushij
Unit 5
Trends in Modern Persian poetry

Sohrab Sepahri
The book: Hasht Kitab-e-Sohrab Sepahri by Sohrab Sepahri

Unit 1
مرگ رنگ، در قیر شب و دود می خیزد،سپیده و مرغ معما
Unit 2
روشن شب، سراب، رو به غروب و غمی غمناک و خراب
Unit 3
جان گرفته، دلسرد، درهٔ خاموش، دنگ و نایاب
Unit 4
دیوار، دریا و مرد، نقش، سرگذشت و وهم
Unit 5
Trends in Modern Persian poetry

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

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w.e.f. 2022 onwards

Suggested readings:

- Tahbaz, Siroos, Barguzida-e-Ash"ar-e-Nima Yushij, Shirkat-e-Intasharate-Ilmi-o-Farhangi, Tehran, 1383
- Sepahri, Sohrab, • Hasht Kitab-e-Sohrab Sepahri, Gufteman-e-Andishae-Maasir, Tehran, 1389
- Abedini, Hasan Mir; Sad Saal Dastan-Nevisi der Iran, Vol. I, II & III,1367 & 1377.
- Akbari, Menuchehr; Naqd-o-Tahlil-e Adabiyyat-Inqelab-e Islami, Vol. I, Tehran, 1371.
- AryanPour, Yahya; Az Nima ta Roozgar-e Ma; Vol. III.
- AryanPour, Yahya; Az Saba ta Nima, Vol. I & II, Tehran, 1374.
- Browne, E.G.; Prose and Poetry in Modern Iran, Cambridge University Press.
- Este,,lami, Md; Barrasi-e Adabiyyat-e Moa"sir, Amir Kabir, Tehran.
- Hakkak, Ahmad Karimi; Essays on NimaYushij: Animating Modernism in Persian Poetry, Brill, 2004.
- Hasanli, Kaoo"s; Guneha-e Nau-Awari der She,,r-e Moa"sir-e Iran, Tehran, 1383.
- Hosseinpor chaffee, Ali; Jiryanha-e She,,ri-e Mo"asir-e Farsi, Amir Kabir,Tehran, 1384.
- Ishaq, Mohammad; Sukhanwaran-e Iran der „Asr-e Hazir, Delhi, 1355
- Kamshad, H.; Modern Persian Prose, Cambridge University Press.
- Langrudi, Shams; Tarikh-e Tahlil-e She,,r-e Nau, Tehran, 1377.
- Qasemi, S.H., Jadid Farsi Sha"eri: Ek Jaeza, Delhi.

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1. 2. Manzar Ali 3. 4 Rizwana

Semester II

Course Code: PER-231 (CBCS) **Course Title : Fundamentals of Persian Language** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Unit- I (Persian Test Book)

- From lesson No 1-6
  (Amozash e Zaban e Farsi Vo 1)

Unit-II

- From Lesson No 7-15
  (Amozash e Zaban e Farsi Vo 1)

Unit-III

- Questions based on Persian Infinitives

Unit-IV

- Question based on Persian Grammar

Unit-V

- Translation from unseen Persian sentences in to English/ Urdu/ Hindi

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Prescribed Book

- Aamozash e Zaban e Farsi Vol 1

Suggested readings:

- Kumar Rajender; Elementary Persian Gramamr Delhi 2016
- Kitabat e Farsi (Baraie Clashai Muaqaddamti) Department of Persian Delhi
- Khanlari, P Netel, Persian Grammar New Delhi
- ZArghami Mehdi, Daura e Amauzish e Zaban E Farsi Teharn
- Moghaddam Ahmed Saffar, A general Course in Persian Tehran

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SEMESTER-III
List of Courses
Course Curriculum

Semester-III		
MPR-301	Modern Persian literature-Prose and Poetry-Level III	4
MPR-302	Classical Persian Literature-Prose and poetry-Level-III	4
MPR-303	Research Methodology	4
MPR-304	Communication skills- level-III	4
MPR-305	History of Persian Literature in Kashmir	4
Open Elective (any one of the following)		
MPR-306	Study of select Epistolography	4
MPR-307	Persian poetry styles (Sabk)	4
MPR-308	Impact of Iranian Culture on Indian Culture	4
MPR-309	Mystical Literature	4
	Total credits	**24**

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SEMESTER-III

Course Code: MPR-301 **Course Title : Modern Persian literature-Prose and Poetry-Level -III** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

MPR-301: Modern Persian literature-Prose and Poetry-Level -III

Prose:

Unit 1: فارسی شکر است، رجل سیاسی از محمد علی جمالزاده

1.1 Text
1.2 History of Short story writing in Persian Literature
1.3 Life and Works of Jamalzadeh

Unit 2: گرداب از صادق هدایت و ماهی و جفتش از ابراهیم گلستان

2.1 Text
2.2 Life and works of Sadiq Hidayat
2.3 Life and works of Ibrahim Gulistan

Unit 3: بچۀ مردم از جلال آل احمد و ترس از امین فقیری

3.1 Text
3.2 Life and works of Jalal Ale Ahmad
3.3 Life and works of Amin Faqiri

Poetry:

The following Poets and Poems only from the book "Shahkaarhay-e Sher-eMoa'sir-e Iran", compiled by Faridun Kaar, pub.by Amir Kabir, Tehran, 1337:

Unit 4: قلب مادر، تمنای عاشق از ایرج میرزا و اسیر، دیو شب از فروغ فرخزاد

4.1 Text
4.2 Life and works of Iraj Mirza
4.3 Life and works of Forogh Farrukhzad

Unit 5: جغد جنگ از ملک الشعرا بهار و مست و هشیار از پروین اعتصامی و گلهای یاس، عشق گمشده از هوشنگ ابتهاج

5.1 Text
5.2 Life and works of Bahar
5.3 Life and works of Parnin E'tesami
5.4 Life and works of Hushang Ibtihaj

<u>Note for Paper Setting</u>:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Shahkaarhay-e She„r-eMoa"sir-e Iran", compiled by Faridun Kaar, pub.by Amir Kabir, Tehran, 1337.
- Abedini, Hasan Mir; Hashtad Saal Dastan Kotāh-e Irani, 2nd edition, Tehran, 1385.
- Abedini, Hasan Mir; Sad Saal Dastan-Nevisi der Iran, Vol. I, II & III, 1367 & 1377.

1. [signature] 2. Manzar Al[signature] 3. [signature] 4 Rizwan [signature]

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- Akbar, Razia; Iran mein Jadid Farsi Adab ke Pachas Saal (1900-1950), Hyderabad, 1991.
- Akbari, Manuchehr; Naqd-o-Tahlil-e Adabiyat-Inqelab-e Islami, Vol. I, Tehran, 1371.
- AryanPour, Yahya; Az Saba ta Nima, Vol. I & II, Tehran, 1374.
- AryanPour, Yahya; AzNima ta Roozgar-e Ma, Vol. III.
- Asghar Ilahi, Safdar TaqiZadeh; Dastanhay-e Kutah-e Iran va Jahan, 2nd Edition, Intasharat-e Tus, Tehran, 1377.

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SEMESTER-III

Course Code: MPR -302 **Course Title : Classical Persian Literature-Prose and poetry-Level-III** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -302: Classical Persian Literature-Prose and poetry-Level-III

Prose:

The following section from Nasr-e Kohan:

Unit 1: سفرنامه ناصر خسرو و قابوس نامه

1.1 Text
1.2 Life and works of Nasir Khusro
1.3 Life and works of Kaikavus

Unit 2: مرزبان نامه و تاریخ بیهقی

2.1 Text
2.2 Life and works of Saduddin Waravini
2.3 Life and works of Abul Fazl Muhammad Baihaqi

Poetry:

Unit 3: 5 Ghazals of Ghani Kashmiri

3.1 Text
3.2 Characteristics of Ghani's poetry
3.3 Life and works of Ghani Kashmiri

Unit 4: 5 Ghazals of Saib Tabrizi

4.1 Text
4.2 life and works of Saib Tabrizi
4.3 Characteristics of Saib's poetry

Unit 5: 5 Ghazalas of Fani Kashmiri

5.1 Text
5.2 Life and works of Fani Kashmiri
5.3 Characteristics of Fani's poetry

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- "Nasr-e-Kohan" Vol. I (Ministry of Culture and Arts, Tehran, 1354)
- Ghani, A., A History of Persian Literature at the Mughal Court (Three Vols.)
- Ghani, A, Pre-Mughal Persian Literature.
- Ghani Kashmiri, Diwan.

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- Nomani, Shibli, Sh"er-ul-Ajam (Five Volumes), Shibli Academy, Azamgarh.
- Shafaq, Raza Zadeh, Tarikh-e-Adabiyat-e-Iran.
- Shirani, Mahmud, Tanqid-e-She"r-ul-Ajam
- Tarikh-e Adabiyat-e-Musalmanan-e-Pakistan-o-Hind (Vol. III, IV & V).
- Arberry, A.J., Classical Persian Literature, Cambridge University Press.
- Jawed, Zinatullah; Naziri ka Takhliqi Sha„ur, Saharanpur, 1990.
- Rahman, S.A., Bazm-e-Mamlukia, Azamgarh.
- Rahman, S.A., Bazm-e-Taimuriya, Azamgarh

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SEMESTER-III

Course Code: MPR -303 **Course Title : Research Methodology** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -303 Course: Research Methodology

Unit- 1: Basics of Research

1.1 Meaning of research
1.2 Types of research
1.3 Function of research

Unit-2: Ethics of Research

2.1 Characteristics of a researcher
2.2 How to choose a supervisor and why
2.3 Preparation of synopsis

Unit-3: Sources

3.1 Primary sources
3.2 Secondary sources

Unit-4: Thesis writing

4.1 Compilation of the material
4.2 Principles of writings of the thesis

Unit-5: Footnotes, Referencing

5.1 Footnotes writings
5.2 Preparation of bibliography and its types

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Ziyaee, Muhammad Ghulam, Rawish-e-Tahqeeq-o-Shinakht-e-Maraja'-e-Adabi, Jami, Tehran, 1380.
- Altick Richard D, Fenstermaker John J. The Art of Literary Research (Fourth Edition), W. W. Norton & Company, 1992.
- Correa, Delia da Sousa, Owens W. R (eds.),The Handbook to Literary Research, Second Edition, London and New York, Routledge, 2009.

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SEMESTER-III

Course Code: MPR -304 **Course Title : Communication skills- level-III** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -304: Communication skills- level-III

Unit 1: Translation from Persian Newspapers on current affairs into English

1.1 News translation from international and national papers
1.2 Literary text translation
1.3 historical text translation

Unit 2: Translation from English Newspapers on current affairs into Persian

2.1 News translation from international and national papers
2.2 Literary text translation
2.3 historical text translation

Unit 3: Translation of Persian Literary and Historical Text into English

3.1 Literary text translation
3.2 historical text translation

Unit 4: Translation of English Literary and historical Text into Persian

4.1 Literary text translation
4.2 historical text translation

Unit 5: Summary of Persian News

5.1 Summary of Persian news on national issues
5.2 Summary of Persian news on international issues

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Kumar Rajinder; Elementary Persian Gramamr Delhi2016
- Khanlari, P Natel, Persian Grammar NewDelhi
- Zarghami Mehdi, Daura e Amauzish e Zaban E FarsiTeharn
- Moghaddam Ahmed Saffar, A general Course in PersianTehran.
- Saeed, Mr. Ahmad, Lessons in Persian, Delhi.
- Persian and English newspapers/ journals/magazines

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SEMESTER-III

Open elective Course Code: MPR -305 **Course Title : History of Persian Literature in Kashmir** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -307: History of Persian Literature in Kashmir

Unit 1: Socio-cultural history of Kashmir

1.1 Socio-cultural history of Kashmir during Shahmiri dynasty
1.2 Socio-cultural history of Kashmir during Chak dynasty
1.3 Socio-cultural history of Kashmir during Mughal dynasty
1.4 Socio-cultural history of Kashmir during Afghan dynasty
1.5 Socio-cultural history of Kashmir during Sikh dynasty
1.6 Socio-cultural history of Kashmir during Dogra dynasty

Unit 2: Persian historiography in Kashmir

2.1 Brief history of history writing in Kashmir
2.1 Introduction to the Persian history writing in Kashmir

Unit 3: History of Persian literature in Kashmir

3.1 History of Persian literature in Kashmir during Shahmiri dynasty
3.2 History of Persian literature in Kashmir during Chak dynasty
3.3 History of Persian literature in Kashmir during Mughal dynasty
3.4 History of Persian literature in Kashmir during Afghan dynasty
3.5 History of Persian literature in Kashmir during Sikh dynasty
3.6 History of Persian literature in Kashmir during Dogra dynasty

Unit 4: Role of Sufis in the development of Persian literature in Kashmir

4.1 Sufis and Persian language, literature and culture
4.2 Sufistic Literature in Kashmir
4.3 Malfuz Literature in Kashmir

Unit 5: The contribution of various dynasties of Kashmir in the progress of Persian language and literature

5.1 Shahmiri dynasty
5.2 Chak dynasty
5.3 Mughal dynasty
5.4 Afghan dynasty
5.5 Sikh dysnaty
5.6 Dogra dynasty

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Mohammed Abdul Ghani, A History of Persian Language and Literature at the Mughal Court, 3 vols., Allahabad, 1929-30.
- Sayyid Moḥammad Abdullah, Adabiyāt-i fārsi men Hindu'on kā ḥiṣṣa, Lahore, 1967.

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- Ẓohur-al-Din Aḥmad, Pakistān men fārsi adab, 2 vols., Lahore, 1964; tr. Shahid Chuhdari as Tārik̲-e adabe fārsi dar Pākestān I, Tehran, 2006.
- Aʿẓam Ḵʷāja Moḥammad, Wāqeʿāt-e Kašmir (Tārik̲-e Kašmir-e Aʿẓami), Lahore, n.d.
- Prithivi N. K. Bamzai, A History of Kashmir, Political, Social, Cultural from the Earliest Times to the Present Day, Delhi, 1962.
- S. N. Dhar, "Persian Translations of Sanskrit Works and Contributions from Kashmir," in Ghulam Rasool Bhatt, ed., Kashmiri Pandits: A Cultural Heritage, New Delhi, 1995.
- Akbar Heydari Kašmiri, ed., Tārik̲-e Kašmir, maʿruf ba Bahārestān-e šāhi, Badgam, 1982; tr. Kashi Nath Pandit as A Chronicle of Mediaeval Kashmir, Calcutta, 1991.
- Biraj Kishan Kaul and Jagmohan Nath Rainah, Taḏkera-ye šoʿarā-ye kašmiri panditān, al-maʿrof ba Bahār-e golšan-e Kašmir, 2 vols., Allahabad, 1931.
- Ḡolām-Ḥasan Ḵuʾihāmi, Tārik̲-e Ḥasan: Dar ḏekr-e šoʿarāʾ-e fārsi, ed. P. N. Pushp, Srinagar, 1961.
- Moḥammad Monawwar Masʿudi, Kašmir kē Fārsi adab kē tārik̲, 1752-1819, Srinagar, 1993.
- Niāzmand, Moḥammad Ṣ. *Kašmir kē Fārsi šoʿarāʾ, 1586 tā 1628*, Srinagar, 1994.

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1. 2. Manzoor 3. 4. Rizwan

SEMESTER-III
Elective-I

Course Code: MPR -306 **Course Title: Study of select Epistolography** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -305: Study of select Epistolography

The following section from Nasr-e Kohan:

Unit 1: Ruqaat e Abul Fazl

1.1 Text
1.2 Brief history of Epistolography in Indo-Persian literature
1.3 Life and works of Abul Fazl

Unit 2: Ruqaat e Alamgir

2.3 Text
2.4 Importance of Rugaat-e Alamgir

Unit 3: Khutut e Ghalib

3.1 Text
3.2 Life and works of Mirza Ghalib

Unit 4: Atabatul katabah

4.1 Text
4.2 Life and works of Muntakhabuddin Badii Ali Atabak

Unit 5: Riyazul Insha

5.1Text
5.2 Life and works of Mahmud Gawan

Prescribed Book

- Nasr e Kohan Vol 1 Ministry of Culture and Arts,Tehra

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

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Semester III

Elective-II

Course Code: MPR-307 **Course Title : Persian poetry styles (Sabk)** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

IPR-306: Persian poetry styles (Sabk)

Unit 1: Sabk e Khurasani

1.1 brief history of Sabk-e Khurasani
1.2 Characteristics of Sabk-e Khurasani
1.3 Prominent poets of Sabk-e Khurasani

Unit 2: Sabk e Iraqi

2.1 brief history of Sabk-e Iraqi
2.2 Characteristics of Sabk-e Iraqi
2.3 Prominent poets of Sabk-e Khurasani

Unit 3: Sabk e Hindi

3.1 brief history of Sabk-e Hindi
3.2 Characteristics of Sabk-e Hindi
3.3 Prominent poets of Sabk-e Hindi

Unit 4: Sabk e bazghasht

4.1 brief history of Sabk-e bazghasht
4.2 Characteristics of Sabk-e bazghasht
4.3 Prominent poets of Sabk-e bazghasht

Unit 5: Sher e Nau or Sher e Nimayi, Sher e Azad or Sapeed

5.1 brief history of Sabk-e Sher e Nau or Sher e Nimayi, Sher e Azad or Sapeed
5.2 Characteristics of Sabk-e Sher e Nau or Sher e Nimayi, Sher e Azad or Sapeed
5.3 Prominent poets of Sabk-e Sher e Nau or Sher e Nimayi, Sher e Azad or Sapeed

6 **Note for Paper Setting**:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Bahar, Muhammad Taqi, Sabk Shanasi, Amir Kabir, Tehran, 1981
- Sirus Shamia, Maktabhay-e Adabi, Tehran, 1390.
- Husaini, Reza Syed; Maktabhay-e Adabi, 2 Volumes, Tehran, 1376.
- Hosseinpour Chaffee, Ali, Jaryanha-e-She"ri-e-Moa"sir-e-Farsi, Amir Kabir, Tehran, 1384.

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1. 2. Manzar 3. 4. Rizwana

Semester III

Elective-III

pen Elective Course Code: MPR -308 **Course Title : Impact of Iranian Culture on Indian Culture** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -308: Impact of Iranian Culture on Indian Culture

Unit 1

Introduction to the Impact of Persian architecture upon MedievalIndian architecture

Unit 2

Introduction to the Impact of Persian culture upon Indian culture

Unit 3

Introduction to the impact of Persian language upon Indianlanguages

Unit 4

Introduction to the impact of Persian literature upon Medieval IndianLiterature

Unit 5

Introduction to the Impact of Persian literature upon Modern Indianliterature

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Nehru, Jawaharlal ,The discovery of India , Signet press publication, New Delhi, 1946
- Jalali Naiieni, MOhamad Reza, Hend dar yek negah, Sokhan publication,Tehran, 1985
- Hekmat, Ali Asghar, Sarzamin-e-Hend, Tehran university publication,Tehran 1988.
- Tara Chand, A short history of the Indian people, Calcutta, 1969.
- Tara Chand, Influence of Islam on Indian Culture, Allahabad, 1954.

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Semester III

Elective-IV

Open elective Course Code: MPR -309 **Course Title : Mystical literature** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum** **Pass Marks: 24**

MPR -309: Mystical literature

The following section from Nasr-e Kohan:

Unit 1: کشف المحجوب از علی هجویری

1.1 Text

1.2 Literary importance of Kahful Mahjub

1.3 Life and works of Ali Hujveri

Unit 2: تذکرة الاولیا از عطار

2.1 Text

2.2 Literary importance of Tazkiratul Awlia

2.3 Life and works of Attar

Unit 3: مناجات و مقالات خواجه عبد الله انصاری

3.1 Text

3.2 Literary importance of Munajat wa Maqalat-e Khwaja Abdulla Ansari

3.3 Life and works of Khwaja Abdulla Ansari

Unit 4: فواید الفواد از حسن سجزی دهلوی

4.1 Text

4. 2 literary importance of Fawaidul Foad

4.3 life and works of Hasan Sijzi

Unit 5: فیه ما فیه

5.1. Text

5.2 Literary importance of Fihi ma Fihi

5.3 Life and works of Maulana Rumi

Suggested Readings:

- Ghanizadeh; Tarikh-e Tasawwuf dar Islam.
- R.A. Nicholson; Mysticism in Islam
- Rizvi, Saiyid Athar Abbas, A History Of Sufism In India 2 Vols.

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1. 2. Manzar 3. 4. Rizwan

SEMESTER-IV
List of Courses

Semester-IV		
MPR-401	Modern Persian literature-Prose and Poetry-Level –IV	4
MPR-402	Classical Persian Literature-Prose and poetry-Level-IV	4
MPR-403	Project and Viva Voce	4
MPR-404	Literary Criticism in Persian	4
Elective (any one of the following)		
MPR-405	History of Indo-Persian Literature (1206-1857)	4
MPR-406	Persian Rhetoric	4
MPR-407	Persian Lexicography	4
MPR-408	Communication Skills- level-IV	4
Open Elective (any one of the following)		
MPR-409	Persian Historiography in India	4
MPR-410	Ethical Literature	4
	Total credits	**24**

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185234

SEMESTER-IV

Course Code: MPR -401 **Course Title : Modern Persian literature-Prose and Poetry-Level -IV** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -401: Modern Persian literature-Prose and Poetry-Level –IV

Prose: The following lessons only from the book «ایرانی کوتاه داستان سال هشتاد», Vol. I compiled by Hasan Mir Abedini, pub. By Kitab-e Khurshid, Tehran, 1385:

Unit 1: مهره مار از یه آذین و به کی سلام کنم از سیمین دانشور و معصوم اول از هوشنگ ابتهاج

1.1 Text

1.2 Life and works of Simin Danishvar and Hushang Ibtihaj

1.3 Salient features of the writings of Simin Danishvar and Hushang Ibtihaj

Unit 2: مرد از محمود دولت آبادی و داستان اول از عزاداران بیل از غلام حسین ساعدی

2.1 Text

2.2 life and works of Mahmud Dawlatabadi and Ghulam Husain Saaedi

2.3 Salient features of the writings of Mahmud Dawlatabadi and Ghulam Husain Saaedi

Poetry: The following Poets and Poems only from the book Shahkaarha-e She,,r-e Moasir-e Iran, compiled by Faridun Kaar, pub. by Amir Kabir, Tehran, 1337:

Unit 3: احمد شاملو: مرغک دریا و پژمان بختیاری: حسرت عشق، عشق آتشین

3.1 Text

3.2 Life and works of Ahmad Shamlu and Pazhman Bakhtiyari

3.3 Characteristics of the poetry of Ahmad Shamlu and Pazhman Bakhtiyari

Unit 4: لطف علی صورتگر: شیراز، اشک و مروارید، روح شاعر و محمد حسین شهریار: دخترک گلفروش، حالا چرا، ای وای مادرم

4.1 Text

4.2 Life and works of Suratgar and Shaharyar

4.3 Characteristics of the poetry of Suratgar and Shaharyar

Unit 5: رهی معیری: خلقت زن، نیروی اشک

5.1 Text

5.2 Life and works of Rahi Muayyeri

5.3 Characteristics of the poetry of Rahi Muayyeri

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- Abedini, Hasan Mir; Hashtad Saal Dastan Kotah-e Irani, 2nd edition, Tehran, 1385.
- Abedini, Hasan Mir; Sad Saal Dastan-Nevisi der Iran, Vol. I, II & III, 1367 & 1377.
- Akbar, Razia; Iran mein Jadid Farsi Adab ke Pachas Saal (1900-1950), Hyderabad, 1991.
- Shahkaarha-e She,,r-e Moasir-e Iran, compiled by Faridun Kaar, pub. by Amir Kabir, Tehran, 1337.
- Browne, E. G., Prose and Poetry in Modern Iran, CambridgePress
- Butler, Christopher. Modernism; a very short introduction,Oxford2010

SEMESTER-IV

Course Code: MPR -402 **Course Title : Classical Persian Literature-Prose and poetry-Level-IV** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -402: Classical Persian Literature-Prose and poetry-Level-IV

The following section from Nasr-e Kohan:

Unit 1: تاریخ بلعمی

1.1 Text
1.2 Life and works of Abu Ali Muhammad Balami
1.3 Literary and historical importance of Tarikh-I Balami

Unit 2: طبقات ناصری

2.1 Text
2.2 Life and works of Qazi Minhaj Siraj
2.3 Literary and historical importance of Tabaqat-I Nasiri

Unit 3: سمک عیار

3.1 Text
3.2 writing style of Samak-I Ayyaar
3.3 Literary importance of Samak-I Ayyaar

The following section from Sukhan va Sukhanwaran:

Unit 4: مسعود سعد سلمان

4.1 Text
4.2 Life and works of Masud Saad Salman
4.3 Characteristics of the poetry of Masud Saad Salman

Unit 5: سنایی غزنوی و عنصری

5.1 Text
5.2 Life and works of Sanai ghaznavi and Unsuri
5.3 Characteristics of the poetry of Sanai ghaznavi and Unsuri

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- Nasr-e-Kohan" Vol. I, Ministry of Culture and Arts, Tehran, 1354
- Sukhan va Sukhanwaran by Faruzanfar, Tehran 1387.

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SEMESTER-IV

Course Code: MPR -403 **Course Title : Project and Viva Voce** **Credits:4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -403 Course: Project and Viva Voce

Objective: This will be a comprehensive Viva Voce examination that aims to assess the overall knowledge of the students which they gained through the four semesters. They will be asked questions pertaining to all subjects they have studies during the past years.

Examination: *Examination in this Course will be conducted orally by the Departmental Faculty.*

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SEMESTER-IV

Course Code: MPR -404 **Course Title : Literary Criticism in Persian** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -405: Literary Criticism in Persian

Unit 1: LiteraryCriticism

1.1 Meaning
1.2 Importance
1.3 Scope

Unit 2: Functions of literary criticism

2.1 Necessity of literary criticism
2.2 Functions of literary criticism
2.2 Types of literary criticism

Unit 3: Different models of literary criticism

3.1 Models of literary criticism
3.2 Textual criticism

Unit 4: History of literary criticism inPersian Literature

4.1 History of literary criticism in Persian literature
4.2 History of literary criticism in Indo-Persian Literature

Unit 5: Introduction to some prominent literary critics of Persian Literature

5.1 introduction to some of literary critics of Persian literature
5.2 Shibli Nomani
5.3 Zarrinkoub

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Dutton Richard; An Introduction to Literary Criticism, Longman York Press, 1984.
- Zarrinkoub, Naqd-e adabi
- Zarrinkoub, Sher be Darogh sher e be Naqab
- Faruzanfar,Badiuzzaman. Sukhan va Sukhanwaran
- AliShariati Dar Naqd-o-Adab.
- Shibli Nomani, Sher-ul-Ajam
- Shirani, Mahmud, Naqd-I Sher-ul-Ajam.

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SEMESTER-IV
Elective-IV/I

Course Code: MPR -405 **Course Title : History of Indo-Persian Literature (1206-1857)** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 50 University Examination: 30** **Sessional Assessment: 20 Minimum Pass Marks: 12**

MPR -404 Course: History of Indo-Persian Literature (1206-1857)

Unit 1

Introduction to Indo-Persian Literature (1206 -1290AD)

Unit 2

Introduction to Indo-Persian Literature (1290 -1526 AD)

Unit 3

Introduction to Indo-Persian Literature (1526-1707 AD)

Unit 4

Introduction to Indo-Persian Literature (1707-1857 AD)

Unit 5

Introduction to Role of Awadh, Hyderabad and Musrshidabad in promotion of Indo-Persian Literature

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Ansari, N.H.; Farsi Adab beAhd-e-Aurangzeb, Delhi.
- Ghani, A.; Pre-Mughal Persian Literature.
- Ghani, A.; Persian Literature at the Mughal Court.
- Hasan, Akhtar; Qutub Shahi Daur Ka Farsi Adab.
- Husain, Iqbal; The Early Persian Poets of India.
- Nomani, Shibli; She"rul Ajam.
- Rahman, M.; Persian Literature under Jahangir & Shahjahan.
- Devare, T. N., A Short History of Persian Literature at the Bahmani, the Adilshahi, and the Qutbshahi Courts, Deccan, Poona, 1961.

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SEMESTER-IV
Elective-IV/II

Course Code: MPR -406 Course Title : Persian Rhetoric Credits: 4 Duration of Examination: 3Hours	Maximum Marks : 100 University Examination: 60 Sessional Assessment: 40 Minimum Pass Marks: 24

MPR -406: Persian Rhetoric

Unit 1: San'at e Lafzi part I

1.1 Tajnees wa Aqsam e Aan
1.2 Ishteqaq
1.3 Lozum e MalaYalzam
1.4 SyaqatulAadab
1.5 Barat eIstehalal

Unit 2: San'at e Lafzi part II

2.1 Tasree
2.2 ShubhaIshteqaq
2.3 Khifa
2.4 ZuQafiatain
2.5 Tausheeh
2.6 Muamma
2.7 Raddus Sadr e alalAjz

Unit 3: San'at e Manavi Part I

3.1 Tabaaq
3.2 MaratunNazeer
3.3 Aks
3.4 Ihaam
3.5 LafoNashr

Unit 4: San'at e Manavi Part II

4.1 Tajreed
4.2 Mubaleghah wa AqsameAan
4.3 Takeed ul Madh bemaYushbehuzzam
4.4 Husn eTaleel
4.5 TajahuleAarefana

Unit 5: San'at e Manavi Part III

5.1 Talmeeh
5.2 Tanseeq usSefat
5.3 Idaj
5.4 Mushkelah

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Dars e Balaghat; Urdu TaraqiBeaurau
- Al Mujam Fi Maayeere Ashaaril Ajam: Shams Qais RaziTehran
- Baharul Fasahat; Najm ulGhani,

1\. 2. Manzar Ali 3. 4.

SEMESTER-IV
Elective-IV/III

Course Code: MPR -407 **Course Title : Persian Lexicography** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -407: Persian Lexicography

Unit 1: History of Persian Lexicography in India

1.1 Brief history of Persian lexicography
1.2 Brief history of Persian lexicography in India

Unit 2: Introduction to Farhang-I Qawwas

2.1 Introduction to the Farhang-I Qawwas
2.2 The importance of Farhang-I Qawwas
2.3 Life and works of Muhammad Qawwas

Unit 3: Lexicography by Khan Arzu

3.1 Persian Lexicography of Khan Arzu
3.2 Life and works of Khan Arzu
3.3 The importance of dictionaries compiled by Khan Arzu

Unit 4: Farhang-I Jahangiri by Jamal-al-Din Ḥosain Enju Shirazi

4.1 Introduction to the Farhang-I Jahangiri
4.2 Life and works of Jamal-al-Din Ḥosain Enju Shirazi

Unit 5: Persian lexicography during later Mughals

5.1 brief introduction to the dictionaries compiled during later Mughal period in India
5.2 life and works of some of the prominent lexicographers of later Mughal period

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Shaharyar Naqavi, Farhang-nevisi-e farsi dar Hind va Pakistan, Tehran, 1962.

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1. 2. Manzar Ali 3. 4. Rizwan Ali

SEMESTER-IV
Elective-IV/IV

Course Code: MPR -408 **Course Title : Communication Skills- level-IV** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -410: Communication Skills Level-IV

Unit 1: Translation from Persian Newspapers on current affairs into English

1.1 News translation from international and national papers
1.2 Literary text translation
1.3 historical text translation

Unit 2: Translation from English Newspapers on current affairs into Persian

2.1 News translation from international and national papers
2.2 Literary text translation
2.3 historical text translation

Unit 3: Translation of Persian Literary and Historical Text into English

3.1 Literary text translation
3.2 historical text translation

Unit 4: Translation of English Literary and historical Text into Persian

4.1 Literary text translation
4.2 historical text translation

Unit 5: Summary of Persian News

5.1 Summary of Persian news on national issues
5.2 Summary of Persian news on international issues

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- Crowin, Michael; Translation and Identity, Rutledge & Francis Group, London, 2006.
- Delisle, Jean; Translation and Terminology, ed; Lee-Jahnke, Hannelore, Ed; Cornier, Monique C, ed., Amsterdam; John Bengamins, 1999.
- Saeed, Mr. Ahmad; Lessons in Persian, Delhi.
- Sāedi, Kāzim Lotfipour; Ūsūl va Ravish-e Tarjome, Tehran, 1392.
- Persian & English Newspapers/Journals/Magazines

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SEMESTER-IV
Elective-IV/V

Open elective Course Code: MPR -409 **Course Title : Persian Historiography in India** **Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -409: Persian Historiography in India

Unit 1: Persian Historiography during Sultanate period

1.1 brief introduction to the Persian Historiography during Sultanate period

1.2 the peculiarities of Persian Historiography during Sultanate period

Unit 2: Persian Historiography during Great Mughals

2.1 brief introduction to the Persian Historiography during Great Mughals

2.2 The peculiarities of Persian Historiography during Great Mughals

Unit 3: Persian Historiography during Later Mughals

3.1 Brief introduction to the Persian Historiography during later Mughals

3.2 The peculiarities of Persian Historiography during later Mughals

Unit 4: Persian Historiography in Regional courts in India

4.1 brief introduction to the Persian Historiography in Regional courts in India

4.2 The peculiarities of Persian Historiography in Regional courts in India

Unit 5: Persian Historiography in Kashmir

5.1 brief history of Persian Historiography in Kashmir

5.2 The peculiarities of Persian Historiography in Kashmir

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested Readings:

- Abdullah, Syed, Adabiyat-e-Farsi mein Hinduon ka Hissa, Punjab University Lahore, 1967.
- Asghar, Aftab, TarikhNavisi-e-Farsi der Hind-o- Pakistan, Lahore, 1985.
- Ghani, A., A History of Persian Literature at the Mughal Court (Three Vols.)
- Ghani, A, Pre-Mughal Persian Literature
- Shafaq, Raza Zadeh, Tarikh-e-Adabiyat-e-Iran., Tehran.
- Mahmud, Sayyid Fayyaz, Tarikh-e Adabiyat-e-Musalmanan-e Pakistan-o Hind (Vol. III, IV & V). Punjab University, 1971
- Rahman, S.A., Bazm-e-Mamlukia, Azamgarh.
- Rahman, S.A., Bazm-e-Taimuriya, Azamgarh

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SEMESTER-IV
Elective-IV/VI

Open elective Course Code: MPR -410 **Course Title : Ethical Literature Credits: 4** **Duration of Examination: 3Hours**	**Maximum Marks : 100 University Examination: 60** **Sessional Assessment: 40 Minimum Pass Marks: 24**

MPR -408: Ethical literature

The following texts only from the book "Nasr-e-Kohan" Vol. I, Ministry of Culture and Arts, Tehran, 1354:

Unit 1: Akhlaq-e Jalali
- 1.1 Text
- 1.2 Life and works of Saaduddin Dawwani
- 1.3 The literary importance of Akhlaq-I Jalali

Unit 2: Akhlaq-e Mohseni
- 2.1 Text
- 2.2 life and works of Waez Husain Kashefi
- 2.3 The literary importance of Akhlaq-I Mohseni

Unit 3: Lawayeh-e Jami
- 3.1 Text
- 3.2 life and works of Jami
- 3.3 The literary importance of Lawayeh-e Jami

Unit 4: Mirsaadul Ibaad
- 4.1 Text
- 4.2 life and works of Najmuddin Razi
- 4.3 The literary importance of Mirsaadul Ibaad

Unit 5: Kimiya-I Saadat
- 5.1 Text
- 5.2 Life and works of Muhammad Ghazali
- 5.3 The literary importance of Kimiya-I Saadat

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective– cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two fromeach unit. The student will attempt 01 question from each unit. Each question will carry 10 marks**(10+50=60).**

Suggested readings:

- Nasr-e-Kohan" Vol. I (Ministry of Culture and Arts, Tehran, 1354)
- Shafaq, Razazadeh, Tarikh-i-Adabiyat-i-Iran, Tehran
- Ahmad, A., Studies in Islamic Culture in the Indian Environment, London, 1964.
- Alam, Muzaffar, Delvoye, Françoise „Nalini", and Marc Gaborieau, The Making of Indo-Persian Culture. Indian and French Studies, Delhi, 2000.
- Devare, T. N., A Short History of Persian Literature at the Bahmani, the Adilshahi, and the Qutbshahi Courts, Deccan, Poona, 1961.

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Syllabus

For

4 Years Undergraduate Degree Programme

(Arabic)

As per the New Education Policy (NEP) 2020

w.e.f August 2022

قسم اللغة العربية

DEPARTMENT OF ARABIC

School of Islamic Studies and Languages

BABA GHULAM SHAH BADSHAH UNIVERSITY

RAJOURI– 185234(Jammu & Kashmir)

www.bgsbu.ac.in / headarabic@bgsbu.ac.in

Subject Combinations

The course combination for 4 years BA Programme under National Education Policy (NEP 2020) during the academic session 2022-23 will be as under;

1. **Major Course:** Any subject in a discipline in which student wants to graduate for 3 years bachelor degree or 4 years bachelor degree with honours/research.
2. **Minor Course:** Any subject other than major available in the college within the discipline.
3. **Multidisciplinary Course (MDC):** Any subject of student's choice which is of interdisciplinary nature from faculties other than major and minor.
4. **Ability Enhancement Course (AEC):** It may be modern Indian Language (MIL), English Language (General), Communication Skill, Mathematical Ability.
5. **Skill Enhancement Course (SEC):** Two credits course each from 1st to 3rd semester..

6. (A) Value Added Courses (VAC) (Compulsory Courses)
4 credits courses comprising of 2 courses in each 1st and 2nd Semester

(a) Understanding India (b) Environmental Science and Education
(c) Digital Technology (d) Health and Wellness

(B) Value Added Courses (VAC) (Optional Courses)
2 credits courses in each 3rd and 4th Semester

(a) Community Engagement (b) National Cadet Corp (NCC)
(c) National Service Scheme (NSS) (d) Sports
(e) Cultural (f) Yoga Education

Credit plan of the Four-Year Undergraduate Programme (FYUP) under National Education Policy (NEP-2020)

1. **Major Course** Each student will study for a) 62 Credits in Major for Three Year Graduation b) 94 Credits in Major for Four Year Graduation (Honours) c) 82 Credits in Major for Four Year Graduation (Honours) with Research
2. Minor Course Each student will study a) 24 credits of Minor course for Three Year Graduation from 1st to 6th semester (4 Credits in each Semester) . b) 32 Credits of Minor in same subject for Four Year Graduation (Honours) with Research.
3. Multidisciplinary Courses from other disciplines (Foundation Courses) 9 Credits of Multidisciplinary Courses of 03 credits each from 1st to 3rd semesters from disciplines other than Major and Minor.
4. Ability Enhancement Course (AEC): Modern Indian Languages (MIL)- Hindi, Dogri, Urdu & Punjabi; English, Communication Skill and Mathematical Ability 9 Credits of AEC Courses of 03 Credits each from 1st to 3rd Semester.

Md. Affan Manzar Ali

5. Skill Enhancement Courses (SEC)

6 credits of Skill Enhancement Courses (SEC) of 2 Credits each from 1st to 3rd Semester.

The courses shall be chosen from the basket of courses from NSQF as notified by the BGSB University. The University Departments/respective Board of Studies can propose new courses in addition to NSQE.

6. (A) Value Added Courses (VAC) (Compulsory Courses)

4 credits courses comprising of 2 courses in each 1st and 2nd Semester

(a) Understanding India (b) Environmental Science and Education
(c) Digital Technology (d) Health and Wellness

(B) Value Added Courses (VAC) (Optional Courses)

2 credits courses in each 3rd and 4th Semester

(a) Community Engagement (b) National Cadet Corp (NCC)
(c) National Service Scheme (NSS) (d) Sports
(e) Cultural (f) Yoga Education

7. Summer Internship

Each student is required to undergo 2 credits of internship in 5th semester.
The details of the Summer Internship shall be notified separately.

8. Research Project/Dissertation

Students pursuing Under Graduate Degree with research shall be required to undergo a Research Project/Dissertation of 12 credits in 8th semester.

Credit Summary:

1 Year Certificate = minimum 40 credits
2 Year Diploma = minimum 80 credits
3 Year Degree = 120 credits
4 Year Degree = 160 credits

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Md. Affan

Manzar Ali

Break up of
Sessional Assessment Awards

Course Credit	Sessional Assessment	Marks
4 credits	Class Test (02 tests)	16 Marks
	Assignments and presentation/ viva	14 Marks
	Class room Attendance	10 Marks
	Total	40
3 credits	Class Test (02 tests)	12 Marks
	Assignments and presentation/ viva	10 Marks
	Class room Attendance	8 Marks
	Total	30
02 credits	Class Test (01 tests)	08 Marks
	Assignments and presentation/ viva	07 Marks
	Class room Attendance	05 Marks
	Total	20
	Attendance Breakup	
	Below 75% (Shortage)	Zero Mark
	76-80	40% 4 Marks
	81-85	60% 6 Marks
	86-90	80% 8 Marks
	91-100	100% 10 Marks

Note: 1st test will be held after the end of the 1st month of teaching while the 2nd will be held after the end of the 2nd month of teaching.

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Md. Affan

Manzar Ala

Course Structure
Four years BA Programme

Semester-I

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-101	Arabic Text and Grammar-I	4	40	60	100
Minor Course:					
BAR-MNR-102	Urdu Ghazal	4	40	60	100
Multi-Disciplinary Course (MDC): I Any one of the following:					
BAR-MDC-103 BAR-MDC-104 BAR-MDC-105	• **English-I** • **Soft Skill for Business-I** (For the students of BA from the Department of Arabic) • **Arabic-I** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC): I Any one of the following:					
BAR-AEC- 106 BAR-AEC- 107 BAR-AEC- 108	• **Hindi-I** • **Persian-I** • **Gojri & Pahari languages**	3	30	45	75
Skill Enhancement Course (SEC):I					
BAR-SEC-109	Professional Excellence in Business	2	20	30	50
Value Added Courses (VAC): I					
BAR-VAC-110	Health and Wellness	2	20	30	50
BAR-VAC-111	Environmental Studies (EVS)	2	20	30	50
	Total	**20**	**200**	**300**	**500**

Semester-II

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-201	Arabic Text and Grammar-II	4	40	60	100
Minor Course					
BAR-MNR-202	Urdu Qasida	4	40	60	100
Multi-Disciplinary Course (MDC):II					
BAR-MDC-203 BAR-MDC-204 BAR-MDC-205	• **English-II** • **Soft Skill for Business-II** (For the students of BA from the Department of Arabic) • **Arabic-II** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC) :II					

Mohd. Aftab

Manzar Alam

Any one of the following:					
BAR-AEC- 206 BAR-AEC- 207 BAR-AEC- 208	• **Hindi-II** • **Persian-II** • **Applied Gojri & Pahari Linguistics**	3	30	45	75
Skill Enhancement Course (SEC):II					
BAR-SEC-209	Event Management **(BBA course)**	2	20	30	50
Value Added Course (VAC):II					
BAR-VAC-210	Understanding India	2	20	30	50
BAR-VAC-211	Digital and Technological Solutions	2	20	30	50
	Total	**20**	**200**	**300**	**500**

- **Semester-II Exit Option** (Certificate, UG Level)

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Semester-III

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-301	Arabic Text and Grammar-III	4	40	60	100
BAR-MJR-302	Translation and Composition-I	4	40	60	100
Minor Course:					
BAR-MNR-303	Urdu (Mazmun Nigari and Khaka)	4	40	60	100
Multi-Disciplinary Course (MDC): III Any one of the following:					
BAR-MDC-304 BAR-MDC-305 BAR-MDC-306	• **English-III** • **Leadership Skills in Management** (For the students of BA from the Department of Arabic) • **Arabic-III** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC): III Any one of the following:					
BAR-AEC- 307 BAR-AEC- 308 BAR-AEC- 309	1) Hindi-III 2) Persian-III 3) Gojri& Pahari Folklore گوجری تے پہاڑی لوک ادب	3	30	45	75
Skill Enhancement Course (SEC): III					
BAR-SEC-310	Creative Writing in Business	2	20	30	50
Value Added Courses (VAC): III (Optional)					
BAR-VAC-311	Physical Education & Yoga	2	20	30	50
	Total	**20+2**	**200+20**	**300+30**	**500+50**

Md. Affan

Semester-IV

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-401	Arabic Text -IV	4	40	60	100
BAR-MJR-402	Arabic Grammar-IV	4	40	60	100
BAR-MJR-403	Translation and Composition: II	4	40	60	100
BAR-MJR-404	History of Arabic Literature: I	4	40	60	100
Minor Course:					
BAR-MNR-405	Urdu Novel	4	40	60	100
Value Added Course (VAC): IV (Optional)					
BAR-VAC-406	NSS	2	20	30	50
	Total	**22**	**220**	**330**	**550**

- **Semester-IV, Exit Option** (Diploma, UG Level)

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Md. Affan

Manzar Ali

Semester-I
List of Courses

Semester-I

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-101	Arabic Text and Grammar-I	4	40	60	100
Minor Course:					
BAR-MNR-102	Urdu Ghazal	4	40	60	100
Multi-Disciplinary Course (MDC): I Any one of the following:					
BAR-MDC-103 BAR-MDC-104 BAR-MDC-105	• **English-I** • **Soft Skill for Business-I** (For the students of BA from the Department of Arabic) • **BAR-MDC-105-Arabic-I** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC): I Any one of the following:					
BAR-AEC- 106 BAR-AEC- 107 BAR-AEC- 108	• **Hindi-I** • **Persian-I** • **Gojri & Pahari languages**	3	30	45	75
Skill Enhancement Course (SEC): I					
BAR-SEC-109	Professional Excellence in Business	2	20	30	50
Value Added Courses (VAC): I					
BAR-VAC-110	Health and Wellness	2	20	30	50
BAR-VAC-111	Environmental Studies (EVS)	2	20	30	50
	Total	**20**	**200**	**300**	**500**

Md. Iffan

Manzar Ali

Semester I
Major-I

Course Code: BAR-MJR-101 **Course Title: Arabic Text and Grammar- I** **Credits: 4** **Contact Hour: 60** **Duration of Examination: 3Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this course, the students will:

CO 1	Get acquainted with the basics of Arabic Language
CO 2	Have new vocabularies
CO 3	Be able to pronounce Arabic correctly
CO 4	Be be able to understand the structure of sentences grammatically
CO 5	Develop their writing and speaking skills

الوحدة الأولى

- ترجمة وشرح النصوص من الدرس الأول إلى الدرس الرابع
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدروس.

الوحدة الثانية:

- ترجمة وشرح النصوص من الدرس الخامس إلى الدرس الثامن
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدروس.

الوحدة الثالثة:

- ترجمة وشرح النصوص من الدرس التاسع إلى الدرس الثاني عشر
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدروس.

الوحدة الرابعة:

- حروف الهجاء
- تعريف الكلمة وأقسامها(الاسم والفعل والحرف)
- المعرفة والنكرة

الوحدة الخامسة:

- أسماء الإشارة، الأسماء الموصولة ، الضمائر
- تقسيم الاسم من حيث الإفراد والتثنية والجمع
- تصريف الفعل الماضي والمضارع (المعروف والمجهول) وفعل الأمر والنهي واسم الفاعل والمفعول

Md. Affan

Manzar

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

الكتب المقررة:

- الدكتور ف. عبدالرحيم : دروس اللغة العربية لغير الناطقين بها. الجزء الأول، اسلامك فاؤنديشن ترست شنائي
- علي الجارم : النحوالواضح ، دانش بك دبو ، متيا محل دهلي
- سراج الدين الندوي : تحفة الصرف(الجزء الأول) ، مركزي مكتبه اسلامي ، دهلي

الكتب المقترحة:

1. وحيد الزمان الكيرانوي : القراء الواضحة (الجزء الأول)كتب خانه حسينيه ، ديوبند عام 2005م
2. أبوالحسن علي الندوي: قصص النبيين للأطفال (الجزءالأول) مؤسسة الصحافة والنشر لكناؤ
3. السيد نبي الحيدر آبادي: منهاج العربية (الجزء الأول)
4. السيد عبد الفتاح الصبري: القراءة الرشيدة (الجزء الأول) مكتبه خدمت ، متيا محل قاسم جان استريت ، دهلي
5. عبد الرحمن الأمرتسري: كتاب النحو وكتاب الصرف ، دانش بك دبو ، متيا محل دهلي
6. سراج الدين الندوي :تحفة النحو وتحفة الصرف(من الجزء الاول الى الجزء الثالث) مركزي مكتبه اسلامي ، دهلي
7. رفيع العماد فينان : ما يلزم من العربية، غود ورد بوكس ، نيو دلهي عام 1999م

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Md. Affan

Manzar Ali

Semester-I
Minor-I

Course Code: BAR-MNR-102 Course Title: Urdu Ghazal and Nazm Credits: 4 Contact Hour: 60 Duration of Examination:3 Hours	Maximum Marks : 100 University Examination: 60 Sessional Assessment: 40 Pass Marks: 24

Course Outcomes:

Through this course the students will:

CO 1	Be introduced to the origin and development of Urdu poetry
CO 2	Be Acquinted with the great figures of Urdu poetic tradition
CO 3	Introduce them to the masterpieces of Urdu Ghazal
CO 4	Be able to appreciate and savour good pieces of Nazm literature in Urdu
CO 5	Develope their taste for appreciating the best of Urdu poetry

Unit I

۱۔غزل کی تعریف، آغاز وارتقاء

۲۔غزل کی اہم فنی خصوصیات

Unit II

۱۔میرؔ، غالبؔ اور داغؔ کے مختصر حالاتِ زندگی اور غزل گوئی

۲۔حسرت موہانی، فراقؔ گورکھپوری اورشہریار کے مختصر حالات زندگی اور غزل گوئی

Unit III

۱۔درج ذیل غزلوں کی تشریح:

- پتہ پتہ بوٹا بوٹا حال ہمارا جانے ہے — میرؔ
- یہ نہ تھی ہماری قسمت کہ وصال یار ہوتا — غالبؔ
- عذر آنے میں ہے اور بلاتے بھی نہیں داغؔ
- بھلاتا لاکھ ہوں لیکن برابر یاد آتے ہیں — حسرتؔ
- سر میں سودا بھی نہیں - فراقؔ

Unit IV

۱۔اردو نظم کی تعریف، آغاز وارتقاء

۲۔درج ذیل اصنافِ سخن کا مختصر تعارف : ۱۔ معری نظم ۲۔ آزاد نظم

Unit-V

۱۔مولانا حالی ، چکبست اور ساحر لدھیانوی کے حالات زندگی اور نظم نگاری

۲۔ مسدس مد و جزر اسلام (پہلے دس بند) خاک ہند (چکبست) صبح آزادی (ساحرلدھیانوی) کی تشریح

Md. Affan

Manzar Ali

Note for paper setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

کتب برائے عمومی مطالعہ:

* ڈاکٹر فرمان فتح پوری : اردو شاعری کا فنی ارتقاء
* ڈاکٹر ممتاز الحق: اردو غزل کی روایت اور ترقی پسند غزل
* یوسف حسین خان: اردو غزل،
* ڈاکٹر وزیر آغا: اردو غزل کا مزاج،
* انتخاب غزلیات، مکتبہ جامعہ، نئی دہلی
* انتخابات منظومات، اردو اکادمی، لکھنؤ
* عبد القادر سروری : جدید اردو شاعری،
* ڈاکٹر وزیر آغا : جدید نظم کی کروٹیں،
* حنیف کیفی : نظم معری وآزاد نظم،
* ایم کے وقار :اردو (گائڈ) ڈاکٹر

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Md. Affan

Manzar Ali

Semester-I

Multi- Disciplinary Course (MDC)-I

Course Code: BAR-MDC- 103 **Course Title: English-I** **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes:

The following are the expected course outcomes:

CO 1	To introduce the students to the basics of grammar and enable them to study different genres of literature.
CO 2	To develop the critical thinking and to uplift the social understanding of the students.
CO 3	To introduce the basic elements of poetry.
CO 4	To make the students appreciate, interpret and critically evaluate the literature.

Unit I: Background:

- Drama, Novel, Short story, essays
- Poetry

Unit II: Essay

- Of Truth by Francis Bacon
- On Superstitions by A.G. Gardiner

Unit III: Poetry

- The Sun Rising by John Donne
- On his Blindness by John Milton

Unit IV: Grammar

- Tenses and their application
- Active Voice, Passive Voice

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objectives – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Books Prescribed:

Charak P and others, *Timeless Thought*, Orient Black swan Private Limited, New Delhi 2010

Books Recommended:

1. Norman Lewis, *Speak Better, Write Better English*, New Delhi,2008
2. Johnson A.J. and A.V. Martinet, *A practical English Grammar* , E.L.B.S. Edition
3. Koul, Nina, *Chinar I*, Rew Anand publications
4. Nissim Ezekel, *A book on Miscellaneous point*
5. Raymond Murphy, *Advanced English Grammar*, Cambridge University press.
6. Wren & Martin, revised by N.D.V. Prasad, *High School English Grammar*, S. Chand & Company Ltd., 1997.
7. English & Communication skills Book-I & II edited by Kuldip Jaidka, Alwinder Dhillan, Pramod Kumar Sugla.

Md. Affan

Manzoor

Semester-I

Multi- Disciplinary Course (MDC)-I

Course Code: BAR-MDC- 104 **Course Title: Soft skill for Business-I** **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes:

The following are the expected course outcomes:

CO 1	To improve speaking and listening skills in communication
CO 2	To learn about effective use of non verbal communication skills.
CO 3	To develop social skills.
CO 4	To know about basic rules of business etiquette.

Unit 1.	Introduction: Understanding communication and importance of communication. Understanding communication environment. Meaning and importance of Listening and Speaking skills. Developing effecting listening and speaking slkills. Starting and sustaining conversation. Effective interaction skills.
Unit 2.	Non verbal communication skills: Meaning and importance of non verbal communication skills in personal and professional life. Appropriate and contextual use of facial expressions, gestures, paralinguistics (such as loudness or tone of voice), body language, proxemics or personal space, eye gaze, haptics (touch), appearance
Unit 3.	Social skills: Interpersonal and intrapersonal skills, Understanding the importance of various skills involved in developing enriching interpersonal relationships. Social skills for workplace success. Methods for improving social skills, Negotiation skills and Conflict handling skills
Unit 4.	Business etiquettes: Introduction to business etiquette, basic rules of etiquette, rules for developing introduction correctly, telephone etiquette, business dining and table manner business to business etiquette, negotiation skills, factor effecting negotiations, negotiation process

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Recommended book(s):

1. Varinder Kumar, Bodh Raj; Business Communication Skills, Kalyani Publishers, NewDelhi, latest edition.
2. Lesikar/Flatly ; (2009) Business Communication , Tata McGraw Hill.
3. Jeff Butterfield; (2012) Soft Skills for Everyone, Cengage Learning centre.
4. Rai and Rai ; Business Communication Prentice Hall, New Delhi
5. Namita Gobar; (2009) Business communication, New Age International Publisher.
6. *C. S. Rayudu* ; Communication skills , Edition, 9 ; Himalayan Publishing House,
7. Asha Kaul; (2010), Effective Business Communication,Prentice Hall.
8. Hurlock, E.B ; Personality Development, Tata McGraw Hill

Md. Affan

Manzar Ali

Semester I

Multi-Disciplinary Cours (MDC)-I

(for the students of other schools)

Course Code: BAR-MDC-105 **Course Title: Arabic-I** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes

CO 1	Learn the basics of Arabic language
CO 2	Get equipped with general vocabulary
CO 3	Know Arabic numerals ,weekdays Islamic months and parts of body
CO 4	Get introduced the basic of Arabic grammar including parts of speech , vowels , types of noun and pronoun

Unit-I (Oral Expression)

- Arabic Alphabets and Arabic numerals
- Weekdays, name of Islamic and English months (in Arabic)
- Parts of human body
- Introduction in Arabic

Unit-II (Arabic Grammar)

- Kalima and Its kinds
- Vowels, Sun and Moon Letters
- Pronoun , definite and indefinite pronoun

Unit-III (Arabic Text)

- From Lesson No. 1- 3

Unit- IV (Arabic Text)

- From Lesson 4-6

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Prescribed Book:

- Dr. Wali Akhter Nadwi: My Arabic Reader, Elementary Level, By, ISRA, New Delhi 2019

Recommended Books:

1. Dr. V Abdur Rahim: Duroosullugha al Arabiyyah, Islamic Foundation Cheeanai.
2. Ali al Jarim: Al Nahwul Wadeh, Danish Bookdepo, Matia Mahal, Delhi
3. Abdur Rahman Amratsari: Kitabu Nahw, Danish Bookdepo, Matia Mahal, Delhi
4. Abdur Rahman Amratsari: Kitabus Sarf, Danish Bookdepo, Matia Mahal, Delhi
5. Sirajuddin Nadvi: Tohfatunnahw, tohfatussarf, Markazi Maktaba Islami, New Delhi

Md. Ishfaq

Semester-I

Ability Enhancement Course (AEC)-I

Course Code: BAR-AEC- 106 **Course Title**: Hindi-I **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

It aims to make the students:

CO 1	Informed about the historical background of Hindi language
CO 2	Acquinted about the grammar and script of Hindi language
CO 3	Enriched in vocablries
CO 4	Know the basic skills of writing

UNIT-1

- देवनागरी वर्णमाला की पहचान, देवनागरी अक्षरों का उच्चारण और लेखन.
- मात्राओं की पहचान, उच्च्चारण एवं लेखन अभ्यास.

UNIT-2

- संयुक्त व्यंजन की पहचान.
- वर्णों का जोड़ना, सही मात्राओं का प्रयोग.
- शुद्ध-अशुद्ध शब्द बोझ.

UNIT-3

- सामान्य शब्दों का अभ्यास (फल, फूल, पशु, पक्षी, रिश्तों के नाम, सप्ताह के दिन, रंगों के नाम).
- शब्दों से वाक्य बनाना.

UNIT-4

- सरल/ मिश्रित/ संयुक्त वाक्य.
- वर्तनी एवं विराम चिह्न.

Prescribed Books:

- डॉ वासुदेवनंदन प्रसाद सिंह : आधुनिक हिन्दी व्याकरण और रचना
- कामता प्रसाद गुरु: हिंदी व्याकरण

Recommended Books:

- श्रीमती राज अग्रवाल: नूतन बाल हिन्दी व्याकरण तथा पत्र
- श्रीमती राज अग्रवाल : सचित्र सरल हिंदी व्याकरण तथा रचना

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Md. Affan

Manzar Ali

Semester-I

Ability Enhancement Course (AEC)-I

Course Code: BAR-AEC- 107 **Course Title: Persian-I** **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

CO 1	Students will have the ability to read & write Persian language
CO 2	In this course students will be taught the applied Persian grammar and passages will be given to translate from Persian into English and vice versa
CO 3	
CO 4	

UNIT I

- Persian language and script

UNIT II

- Persian Grammar and Translation

Unit III

- *Saffar Muqaddam, Lesson No:* 1-8

Unit IV

- *Saffar Muqaddam, Lesson No:9-16*

Note for Paper Setting:

- The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Prescribed Books:

1. Dr. Ahmad: Saffar Muqaddam, Zaban-e Farsi, Council for the Promotion of PersianLanguage and Literature, Tehran, Iran, Vol. I,II & III

Recomended Books:

2. Let's learn Persian, NCPUL, Ministry of HRD, New Delhi.
3. Prof. Rajinder Kumar: Elementary Persian Grammar .
4. Passages from books, Magazines and Journals

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Md. Affan

Semester-I

Ability Enhancement Course (AEC)-I

Course Code: BAR-AEC- 108 **Course Title: Introduction to Gojri & Pahari Languages** **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

CO 1	Students will learn about the origin and development of Gojri literature
CO 2	Students will learn about the origin and development of Pahari literature
CO 3	Students will know about the cloassical literature of Gojri and Pahari
CO 4	Students will know about the modern literature of Gojri and Pahari

UNIT I: Medieval Gojri Literature	**یونٹ 1:** قدیم گوجری ادب
• Origin & Development	قدیم گوجری کی شروعات
• Theories of Historians	تاریخ داناں کا نظریات: جمیل جالبی
• Medieval Gojri Poets: Khusro, Kabir, Mira Bai, Amin Gujrati	قدیم گوجری شاعر: امیر خسرو، بھگت کبیر، میرا بائی، امین گجراتی
UNIT II: Modern Gojri Literature (20th Century)	**یونٹ 2:** جدید گوجری ادب
• Renaissance & Phases of development	گوجری زبان تے ادب کا دور
• Role of Governmental institutions	جدید گوجری ادب کی ترقی ما سرکاری اداراں کو رول
• Role of NGOS in development of Gojri	جدید گوجری کی ترقی ما غیر سرکاری اداراں کو رول
UNIT III: Pahari Linguistics-I	**یونٹ 3: پہاڑی لسانیات 1**
• Pahari Language: Theories of Origin	پہاڑی زبان نی شروعات نے نظریے
• Provinces of Pahari	پہاڑی زبان نے علاقے
• Characteristics & Dialects of Pahari	پہاڑی زبان نی انفرادیت تے بکھ بکھ لہجے
UNIT IV: Pahari Linguistics-II	**یونٹ 4: پہاڑی لسانیات 2**
• Classical Pahari Poetry	پہاڑی زبان نا کلاسیکی ادب
• Modern Literary Movement	جدید پہاڑی ادب نی تحریک
• Role of Institutions in development	پہاڑی زبان نی ترقی وچ مختلف اداریاں نا رول

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

RECOMMENDED BOOKS :
مسعود حسین خان: مقدمہ تاریخ زبان اردو
رام بابو سکسینہ: اردو ادب کی تاریخ
اردو ادب کی تاریخ: گیان چند جین، سیدہ جعفر
گوجر، گوجری زبان و ادب: ڈاکٹر رام پرشاد کھٹانہ
گوجری ادبیات: ڈاکٹر رفیق انجم
پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری
شیرازہ پہاڑی(زبان نمبر): کلچرل اکیڈمی
شیرازہ گوجری(گولڈن جوبلی نمبر): کلچرل اکیڈمی

Md. Yasin

Manzoor

Semester-I

Skill Enhancement Course (SEC)-I

Course Code: BAR-SEC- 109 **Course Title: Professional Excellence in Business** **Credits: 2** **Contact Hour: 36** **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes

On successful completion of the course, the students will be able to

1. CO1: To enhance the knowledge of professionalism.
2. CO2: To develop personal and interpersonal skills
3. CO3: to develop customer centric approach for business

Unit 1.	**Introduction:** Meaning of professionalism, importance of professionalism, difference between profession, professional and professionalism, professionalism on and off workplace, handling customers and identifying their need
Unit 2.	**Personal skills:** Meaning, importance, personal development, physical and mental fitness **Interpersonal skills:** core interpersonal skills, building interpersonal relationship
Unit 3.	Management games, managing customer centric approach for business, resume preparing activities, team building activities, leadership development activities.

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 6 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 6 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 8 marks (06+24=30).

Recommended books	1. Alan P. Rossiter, 2008 "Professional excellence: beyond technical competence 2. Frederic P. Bemak. Ronert K. Conyne. 2017 "journey to professional excellence. 3. Sharma. P. 2020 "soft skills personality development for life success".

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Semester-I
Value Added Course (VAC)-I

Course Code: BAR-VAC- 110 **Course Title: Health and Wellness** **Credits: 2** **Contact Hour: 36** **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes:

1. To help understand the importance of a healthy lifestyle
2. To familiarize students about physical and mental health
3. To create awareness of various lifestyle diseases
4. To provide understanding of stress management

Unit 1.	**Introduction to Health and Wellness (a):** Define and differentiate health and wellness. Importance of health and wellness education. Local, demographic, societal issues and factors affecting health and wellness. Diet and nutrition for health and wellness. Essential components of balanced diet for healthy living with specific reference to the role of carbohydrates, proteins, fats, vitamins& minerals.
Unit 2.	**Introduction to Health and Wellness (b):** Malnutrition, under nutrition and over nutrition. Processed foods and unhealthy eating habits. Body systems and common diseases. Sedentary lifestyle and its risk of disease. Stress, anxiety, and depression. Factors affecting mental health. Identification of suicidal tendencies. Substance abuse (Drugs, Cigarette, Alcohol) de-addiction, counseling and rehabilitation.
Unit 3.	**Management of Health and Wellness:** Healthy foods for prevention and progression of Cancer, Hypertension, Cardiovascular, and metabolic disease (Obesity, Debates, Polycystic Ovarian Syndrome). Types of Physical Fitness and its health benefits. Modern lifestyle and hypo-kinetic disease; prevention and management through exercise. Postural deformities and corrective measures. Spirituality and mental health. Role of yoga, asanas and meditation in maintaining health and wellness. Role of sleep in maintenance of physical and mental health.

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 6 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 6 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 8 marks (06+24=30).

Recommended books	1. Claude Bouchard: Physical Activity and Health, Steven N. Blair, William L. Haskell competence. 2. Emily Attached and Marzia Fernandez: Mental Health Workbook, 2021. 3. Nashay Loric: Mental Health Workbook for Women: Exercise to Transform Negative Thoughts and Improve Well-Being , 2022. 4. C. Nyambichu and Jeff Lumiri: Lifestyle Disease Management, 2018 5. Angela Clow & Sarah Edmunds: Physical Activity and Mental Health , 2013.

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Semester-I

Value Added Course (VAC)-I

Course Code: BAR-VAC- 111 **Course Title:** Environmental Studies (EVS) **Credits: 2** **Contact Hour: 36** **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes:

1. This course is expected to inculcate a critical thinking on various dimensions of environment through knowledge, skill, critical thinking and problem solving.
2. This course attempts to create pro-environment attitude and a behavioral pattern in student community and society that attaches importance and priority to create sustainable life style and awareness on various environmental issues.

Unit 1.	**Understanding the Environment:** • Environment: concept, importance and components. • Ecosystem: concept, structure and function (food chain, food web, ecological pyramids and energy flow)
Unit 2.	• Biodiversity: levels, values and threats and conservation • Concept and objectives of environmental education, environmental ethics • Natural recourses: renewable and non-renewable (Global status, distribution and production)
Unit 3.	• Management of natural resources: Individual, community and government managed • Air, water and soil pollution: Causes, consequences and control • Solid waste management: collection, segregation, transportation and disposal;3R's • Climate change: Causes and consequences

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 6 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 6 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 8 marks (06+24=30).

Recommended books	• Asthana, D.K. Text Book of Environmental Studies. S. Chand Publishing. • Basu, M, Xavier, S. Fundamentals of Environmental Studies, Cambridge University Press, India. • Basu, R.N., (Ed) Environment. University of Calcutta, Kolkata. • Bharucha, E. Textbook of Environmental Studies for Undergraduate Courses. Universities Press. • Miller T.O. Jr., Environmental Science, Wadsworth Publishing Co.

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Semester-II
List of Courses

Semester-II

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-201	Arabic Text and Grammar-II	4	40	60	100
Minor Course					
BAR-MNR-202	Urdu Qasida	4	40	60	100
Multi-Disciplinary Course (MDC):II					
BAR-MDC-203 BAR-MDC-204 BAR-MDC-205	• **English-II** • **Soft Skill for Business-II** (For the students of BA from the Department of Arabic) • **BAR-MDC-105-Arabic-II** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC) :II Any one of the following:					
BAR-AEC- 206 BAR-AEC- 207 BAR-AEC- 208	• **Hindi-II** • **Persian-II** • **Gojri & Pahari languages**	3	30	45	75
Skill Enhancement Course (SEC):II					
BAR-SEC-209	Event Management **(BBA course)**	2	20	30	50
Value Added Course (VAC):II					
BAR-VAC-210	Understanding India	2	20	30	50
BAR-VAC-211	Digital and Technological Solutions	2	20	30	50
	Total	**20**	**200**	**300**	**500**

- **Semester-II Exit Option** (Certificate, UG Level)

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Semester II
Major-II

Course Code: BAR-MJR-201 **Course Title: Arabic Text and Grammar-II** **Credits: 4** **Contact Hour: 60** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Through this course, the students will:

CO 1	Get acquainted with the basics of Arabic language
CO 2	Have new vocabularies
CO 3	Be able to pronounce Arabic correctly
CO 4	Be able to understand the structure of sentences grammatically
CO 5	Develop their writing and speaking skills

الوحدة الأولى:

- ترجمة وشرح النصوص من الدرس الأول إلى الدرس الرابع
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدروس.

الوحدة الثانية:

- ترجمة وشرح النصوص من الدرس الخامس إلى الدرس الثامن
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدرس.

الوحدة الثالثة:

- ترجمة وشرح النصوص من الدرس التاسع إلى الدرس الثاني عشر
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدرس.

الوحدة الرابعة:

- جمع المذكر السالم ، جمع المؤنث السالم ، جمع التكسير
- الجملة المفيدة وغير المفيدة
- الموصوف والصفة، المضاف والمضاف إليهد، المبتدأ والخبر

الوحدة الخامسة:

- تصاريف أبواب الثلاثي المجرد:

نصر، ضرب ، سمع ، كرم، فتح، حسب

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark.

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Section B will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

الكتب المقررة:

- الدكتور ف. عبدالرحيم : دروس اللغة العربية لغير الناطقين بها. الجزء الثاني : اسلامك فاؤنديشن ترست شنائي
- علي الجارم: النحوالواضح، دانش بك دبو ، متيا محل دهلي
- سراج الدين الندوي: تحفة الصرف(الجزء الثاني) ، مركزي مكتبه اسلامي ، دهلي

الكتب المقترحة:

1. سراج الدين الندوي : تحفة الصرف (من الجزء الاول الى الجزء الثالث)، مركزي مكتبه اسلامي نيو دلهي
2. سراج الدين الندوي: تحفة النحو(من الجزء الاول الى الجزء الثالث)، مركزي مكتبه اسلامي ، نيو دلهي
3. مصطفى العلايني: جامع الدروس العربية، مطبعة المصباح، بيروت، لبنان
4. وحيد الزمان الكيرانوي: القراءة الواضحة (الجزء الثاني)، كتب خانه حسينيه ، ديوبند عام 2005م
5. أبوالحسن علي الندوي: قصص النبيين للأطفال (الجزء الثاني)، مؤسسة الصحافة والنشر، لكناؤ
6. رفيع العماد فينان: ما يلزم من العربية، غود ورد بوكس نيو دلهي عام 1999م
7. كامل الكيلاني: مجموعة القصص العربية للأطفال ، المتكبة اليوسفيه ديوبند عام 2006م

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Semester II
Minor-II

Course Code: BAR-MNR-202 **Course Title: Urdu Qasida** **Credits: 4** **Contact Hours: 60** **Duration of Examination: 03 Hours**	**Maximum Marks:100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this paper students will:

CO 1	Learn the origin and development of Urdu Ode and its basic components
CO 2	Be tntroduced to the masterpieces of Urdu ode
CO 3	Have a knowledge of the Urdu Elegy
CO 4	Be also introduced to the masterpieces of Urdu elegy
CO 5	Get aacquinted with the best Pieces of Urdu Mathnawi

Unit I

۱۔ اُردو قصیدہ: تعریف، آغاز وارتقاء
۲۔ قصیدے کے اجزائے ترکیبی
۳۔قصیدہ شہر آشوب (سودا)کی تشریح (ابتدائی دس شعر)

Unit II

۱۔ قصیدہ در مدح بہادر شاہ ظفر۔ذوقؔ(ابتدائی دس بند)
۲۔ سوداؔکے حالات زندگی اور قصیدہ نگار ی کا مختصر جائزہ
۳۔، ذوقؔ کے حالات زندگی اور قصیدہ نگار ی کا مختصر جائزہ

Unit III

۱۔اُردو مرثیہ: تعریف، آغاز وارتقاء، اجزائے ترکیبی
۲۔نمک خوان تکلم ہے فصاحت میری (میر انیسؔ، ابتدائی دس بند)
۳۔ مرثیہ غالب (حالی) کیا کہوں حال

Unit IV

۱۔اُردو مثنوی: تعریف، آغاز وارتقاء
۲۔مثنوی سحر البیان (میر حسن) کی تشریح
۳۔ میر حسن کے حالات زندگی اور مثنوی نگاری کا مختصر جائزہ

Unit V

۱۔ اردو رباعی: تعریف، آغاز وارتقاء
۲۔ ہیئت اور وزن(مختصر جائزہ)
۳۔تلوک چند محروم اور فراق گورکھپوری کے حالات زندگی اور رباعی گوئی کا مختصر مطالعہ

Note for paper setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

کتب برائے عمومی مطالعہ

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* ڈاکٹر فرمان فتح پوری: اردو شاعری کا فنی ارتقاء،
* عبد القادر سروری: اردومثنوی کا ارتقاء،
* مسیح الزماں: اردو مرثیہ کا ارتقاء،
* اطہر فاروقی: اردو مرثیہ،
* محمود الہی: اردو میں قصیدہ نگاری،
* ابو محمد سحر: اردومیں قصیدہ نگاری،
* شبلی نعمانی: موازنہ انیس ودبیر،

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Semester II
Multi-Disciplinary Cours (MDC)-II

Course Code: BAR-MDC-203 **Course Title: English-II** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes:

The course will attempt:

CO 1	To lead the students towards a greater understanding of human values and ethics.
CO 2	To expose the students to the best pieces of poetry and make them understand the beauty and communicative power of English.
CO 3	To enhance the awareness of students in understanding the society.
CO 4	To expose the students to the Indian Drama and make them understand the thematic concerns of the period.
CO 5	To make the students learn and understand the grammatical skills in English.

Unit I: Poetry

- *Shall I Compare thee to a summer's day?* By William Shakespeare

Unit II: Novel

The Guide by R K Narayan

Unit III: Drama

- *Post Office* by R N Tagore

Unit IV: Grammar

- Corrections : Corrections related to different parts of speech
- Punctuation and its application

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Books Prescribed:

Charak P and others, *Timeless Thought*, Orient Black swan Private Limited, New Delhi 2010

Books Recommended:

1. Norman Lewis. *Speak Better Write Better English*, New Delhi,2008
2. Johnson A.J. and A.V. Martinet. *A practical English Grammar* , E.L.B.S. Edition
3. Koul, Nina. *Chinar I* Rew Anand publications
4. Murphy, Raymond. *Advanced English Grammar*, Cambridge University press.
5. Nissim Eizekel, *A book on Miscellaneous point*
6. Wren & Martin, revised by N.D.V. Prasad, *High School English Grammar*, S. Chand & Company Ltd, 1997.

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Semester II

Multi-Disciplinary Cours (MDC)-II

Course Code: BA-MDC-204 **Course Title: Soft Skill for Business-II** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes: On successful completion of the course, the students will be able

1. To improve speaking and listening skills in communication,
2. To learn about effective use of non verbal communication skills.
3. To develop social skills
4. To know about basic rules of business etiquette.

Unit 1.	Introduction: Understanding communication and importance of communication. Understanding communication environment. Meaning and importance of Listening and Speaking skills. Developing effecting listening and speaking slkills. Starting and sustaining conversation. Effective interaction skills.
Unit 2.	Non verbal communication skills: Meaning and importance of non verbal communication skills in personal and professional life. Appropriate and contextual use of facial expressions, gestures, paralinguistics (such as loudness or tone of voice), body language, proxemics or personal space, eye gaze, haptics (touch), appearance
Unit 3.	Social skills: Interpersonal and intrapersonal skills, Understanding the importance of various skills involved in developing enriching interpersonal relationships. Social skills for workplace success. Methods for improving social skills, Negotiation skills and Conflict handling skills
Unit 4.	Business etiquettes: Introduction to business etiquette, basic rules of etiquette, rules for developing introduction correctly, telephone etiquette, business dining and table manner business to business etiquette, negotiation skills, factor effecting negotiations, negotiation process

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Recommended book(s):	1. Varinder Kumar, Bodh Raj; Business Communication Skills, Kalyani Publishers, NewDelhi, latest edition. 2. Lesikar/Flatly ; (2009) Business Communication , Tata McGraw Hill. 3. Jeff Butterfield; (2012) Soft Skills for Everyone, Cengage Learning centre. 4. Rai and Rai ; Business Communication Prentice Hall, New Delhi 5. Namita Gobar; (2009) Business communication, New Age International Publisher. 6. *C. S. Rayudu* ; Communication skills , Edition, 9 ; Himalayan Publishing House, 7. Asha Kaul; (2010), Effective Business Communication,Prentice Hall. 8. Hurlock, E.B ; Personality Development, Tata McGraw Hill

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Semester II

Multi-Disciplinary Cours (MDC)-II

(for the students of other schools)

Course Code: BAR-MDC-205 **Course Title: Arabic-II** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes

CO 1	Learn the basics of Arabic language
CO 2	Get equipped with general vocabulary
CO 3	Know Arabic numerals, weekdays Islamic months and parts of body
CO 4	Get introduced the basic of Arabic grammar including parts of speech, vowels, types of nouns and pronoun
CO 5	Learn noun and pronoun

Unit-I (Oral Expression)

- Name of colors , flowers , fruits and vegetables
- My House
- My University
- Introduction with company manager

Unit-II (Oral expression)

- At the Airport
- At the Hotel
- At the Market
- At the Bank

Unit-III (Arabic Grammar)

- Demonstrative and Relative pronoun and Interrogative Letters and its uses.
- Genitive Construction
- Adjectives
- Conjugation of الفعل الماضي والمضارع والأمر والنهي

Unit- IV (Arabic Text)

- From Lesson 07-10
- From lesson -11-13

Prescribed Book:

- Dr. Wali Akhter Nadwi: **My Arabic Reader**, Elementary Level, By, ISRA, New Delhi 2019

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Recommended Books:

- Dr. V Abdur Rahim: Duroosullugha al Arabiyyah, Islamic Foundation Cheeanai.
- Ali al Jarim: Al Nahwul Wadeh, Danish Bookdepo, Matia Mahal, Delhi
- Abdur Rahman Amratsari: Kitabu Nahw, Danish Bookdepo, Matia Mahal, Delhi
- Abdur Rahman Amratsari: Kitabus Sarf, Danish Bookdepo, Matia Mahal, Delhi
- Sirajuddin Nadvi: Tohfatunnahw, tohfatussarf, Markazi Maktaba Islami, New Delhi

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Semester II

Ability Enhancement Course (AEC)-II

Course Code: BAR-AEC- 206 **Course Title:** Hindi-II **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

The Course aims:

CO 1	To enable the students to study about the most prominent poets
CO 2	It will enable the the students to have thorough understanding of drama and its technical aspects
CO 3	To introduce the students to the novel writing of such famous novelists as Prem Chand
CO 4	Make the students aquire the knowledge of essay writing

UNIT-1

- कहानीकार: चंद्रधर शर्मा गुलेरी, प्रेमचंद, जयशंकर प्रसाद.
- कहानियाँ: उसने कहा था, ईदगाह, मधुआ.

UNIT-2

- नाटक की परिभाषा एवं स्वरूप.
- 'कबीरा खड़ा बाज़ार में' नाटक की साहित्यिक व्याख्या.

UNIT-3

- प्रेमचंद पूर्व हिंदी उपन्यास: सामान्य परिचय.
- कर्मभूमि का समीक्षात्मक अध्ययन.

UNIT-4

- निबंध: परिभाषा एवं स्वरूप.
- मन की दृढ़ता - बालकृष्ण भट्ट.

Recommended Books:

- आचरण की सभ्यता – पूर्ण सिंह.
- आम फिर बौरा गए – हज़ारी प्रसाद द्विवेदी.
- हिंदी कहानी: उद्भव और विकास – सुरेश सिन्हा
- हिंदी नाटक: उद्भव और विकास – दशरथ ओझा
- हिंदी उपन्यास का विकास – गोपाल राय
- हिंदी निबंध साहित्य – विजय शंकर

Prescribed Book

- मानसरोवर 8 भाग- मुंशी प्रेमचंद
- प्रतिनिधि संकलन बालकृष्ण भट्ट :

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

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Semester II

Ability Enhancement Course (AEC)-II

Course Code: BAR-AEC- 207 **Course Title: Persian-II** **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

The course is designed:

CO 1	To introduce the students to Iranian seasons, its culture, some of its important cities
CO 2	To introduces to some of Iran's great Persian Poets with their poetry
CO 3	It also highlights the life and works of some of the prominent Persian poets
CO 4	The selection on festivals helps a learner to know Iranian Culture and traditions.

Unit 1

- Fasl-Hae-Saal
- Zamistan-o-Tabistan
- Bahar
- Mazandaran

Unit 2

- *Jashn-e-Mehregaan*
- *Jashn-e-Sadeh*
- *Firdausi*
- *Sa'di Shirazi*

Unit 3

- *Dehqaan-e-Fidakaar*
- *Shaban-o-Gusfand*
- *Kudak-e-Hushyaar*
- *Gawahi-e-Derakht*

Unit 4

- Comprehension and Translation from Persian to English, Hindi or Urdu

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

References:

1. *Kitab-e-Farsi: Baraye Class-hae Muqaddemati*, Department of Persian, University of Delhi, Delhi-110 007.
2. *Kitab-e-Farsi: Baraye Class-hae Diplom*, Department of Persian, University of Delhi, Delhi110 007.
3. *Kitab-e-Farsi: B.A. (Prog.)*, Part-I/II/III, Department of Persian, University of Delhi, Delhi-110 007
4. *Nisab-e-Jadeed Farsi*, Jayyad Press, Ballimaran, Delhi-110 006.

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Semester II

Ability Enhancement Course (AEC)-II

Course Code: BAR-AEC- 208 **Course Title:** Applied Gojri & Pahari Linguistics **Credits: 3** **Contact Hour: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

The course is designed:

CO 1	To introduce the students to Gojri linguistics
CO 2	To introduces to Applied Gojri Grammar
CO 3	To introduce the students to Pahari linguistics
CO 4	To introduces to Applied Pahari Grammar

UNIT I: Gojri Linguistics	**یونٹ 1**: گوجری لسانیات
• Gojri Alphabets &Orthography	گوجری: رسم الخط املا تے تلفظ
• Special features: Low tones/Retroflexes	گوجری صوتیات کی خاصیت
• Gojri Dialects	گوجری لہجا
UNIT II: Practical Gojri Grammar	**یونٹ 2**: عملی گرائمر
• Number & Gender	واحد جمع تے مونث مذکر
• Numerals, Names of Days & Months	گنتی، دناں تے مہیناں کا ناں
• **Syntax**	جملہ سازی (بناوٹ کا اصول)
UNIT III: Pahari Linguistics	**یونٹ 3**: پہاڑی لسانیات
• Pahari Alphabets & Orthography	پہاڑی زبان نا لسانی ڈھانچہ
• Pahari Language: Special features	پہاڑی زبان نی امتیازی خصوصیات
• Pahari Language: Dialects	پہاڑی زبان نے بکھرے بکھرے لہجے
UNIT IV: Practical Pahari Grammar	**یونٹ 4**:پہاڑی گرائمر
• Pahari Phonetics	پہاڑی زبان نی صوتیات
• Pahari Orthography	پہاڑی زبان نی صرفیات
• Pahari **Syntax**	پہاڑی زبان نی نحویات

<u>Note for Paper Setting</u>:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

		RECOMMENDED BOOKS :	
		ڈاکٹر رفیق انجمؔ:گوجری ادبیات	
		راجہ نذر بونیاری :پہاڑی زبان و ادب دی تاریخ	
		منشاء خاکی ، ڈاکٹر رفیق انجم :بنیادی گوجری گرائمر	
		ڈاکٹر جاوید راہی تے انور حسین :گوجری گرائمر	
		سید آصف شاہ :ہک لسانی پوہچ(پہاڑی گرائمر)	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

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Semester-II

Skill Enhancement Course (SEC)-II

Course Code: BAR-SEC- 209 **Course Title:** Event Management **Credits: 2** **Contact Hour: 30** **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes: On successful completion of the course, the students will be able to

1. CO1: Understand the concept of foundation of events.
2. CO2: To Know about Economic and social significance of MICE
3. CO3: understand about Conference, Convention and Events Venues

Unit 1.	**Conceptual foundations of Events** Major Characteristics; five C's of event management Conceptualization, Costing, Canvassing, Customization, Carrying out; Advantages of events- to the Organizer, Event Planner, Participants, Economy and Society; Broad classification of Events, Event planning process..
Unit 2.	**Concepts of MICE** Evolution of MICE industry; Components, Economic and social significance of MICE, Planning and Sustainable Planning for MICE; Professional meeting planning-definition, types and roles; associate, corporate & independent meeting planners; TA's and TO's as meeting planner; Responsibilities/Role of Meeting planners.
Unit 3.	**Conference, Convention and Events Venues** Concept and types; Conference venues- facilities, check-in and check-out procedures, requirements; conference room lay-outs; Conventions-meaning, significance and process, Convention manager; Convention visitor Bureaus – functions, structure and funding sources, Introduction to conference facilities in India. Role and functions of ICPB and ICCA.

Note for Paper Setting:

The question paper will be divided into two sections. Section A will carry 6 compulsory, objective –cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 6 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 8 marks (06+24=30).

Recommended books	1. Coleman, Lee &Frankle, Powerhouse Conferences. Educational Institute of AH & MA. . 2. Hoyle, Dorf & Jones, Meaning conventions & Group business. Educational institute of AH & MA. 3. Judith Mair, Conferences and Conventions A Research Perspective Routledge – 20 Series: 4. Montgomery, R.J, Meeting, Conventions and Expositions: VNR, New York 5. Vassilios Ziakas. Event Portfolio Planning and Management A Holistic Approach Rout.

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Semester-II

Value Added Course (VAC)-II

Course Code: BAR-VAC-210 **Course Title:** Understanding India **Credits:** 2 **Contact Hour:** 30 **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Learning Objectives: Maximum Lectures to be delivered:30

1. To understand the physical and human geography of India
2. To make student aware of the trajectories of historical and cultural development of India and the making of unity in diversity
3. To familiarize students with the process of constitutional developments and its emergence as one of the largest democratic state in the world.

UNIT-I

I. National boundaries and the major geographical attributes: Mountains, Rivers and the mineral resources

II. Human Geography: Pattern of demographic distribution with special reference to Tribes in India

III. Cultural and linguistic diversity

UNIT-II

I. Perceptions of the past: Orientalist, Colonial and the Nationalist construct: Recent construct of the past

II *Bharatavarsha*: concept and its evolution: Vedic, Epic and Puranic traditions and the making of Modern India

III. State and Imperial formation: Rise of Janapadas, The Mauryas, the Kushanas, the Guptas, Pallava, Cholas and Vijayanagara empire

UNIT-III

I. Origin and growth of major religious streams: Vedic, Jainism, Buddhism, Bhakti and Sufism, Brahmo Samaj, Arya Samaj, Religious philosophy of Sri Aurobindo

II. Development of Temple art and architecture

III. Development of literary traditions: Panini, Kalidasa, Veda Vyasa, Valmiki

Readings:

- Gore, M. S. (2002) Unity in Diversity: The Indian Experience in Nation-Building, Rawat Publication, Jaipur.

- Government of India, Economic Survey (Annual), Economic Division, Ministry of Finance, New Delhi.
- K. Roy, C. Saunders and J. Kincaid (2006) (eds.) 'A Global Dialogue on Federalism', Volume 3Montreal, Queen's University Press.
- Kabir, Humayun (1946). Our Heritage, National Information and Publications Ltd., Mumbai.
- L. Rudolph and S. Rudolph, (2008) 'Explaining Indian Institutions: A Fifty Year Perspective, 1956-2006', Volume 2, New Delhi, Oxford University Press.
- M. Singh, and R. Saxena (2011) (eds.), 'Indian Politics: Constitutional Foundations and Institutional Functioning', Delhi: PHI Learning Private Ltd.
- Malik, S. C. (1975). Understanding Indian Civilization: A Framework of Enquiry. Indian Institute of Advanced Study, Shimla.
- Ministry of Human Resource Development.
- Ministry of Skill Development and Entrepreneurship.
- Misra, S.K and Puri (2020), V.K.: Indian Economy, Himalaya Publishing House, Mumbai.
- MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India
- Romila Thapar (2016) History of India, Tylor and Francis.
- S. Chaube, (2009) 'The Making and Working of the Indian Constitution', New Delhi, National Book Trust
- S. Cohen, (2002) India: Emerging Power, Brookings Institution Press
- Satish Chandra (2009) History of Medieval India , Orient Black Swan, New Delhi.
- Schneider, T. and Collins, L. (1998): Disaster Management and Preparedness, Lewis Publishers, Washington, D.C. 12.
- Sharma, T.C. (2013) Economic Geography of India, Rawat Publication, Jaipur.
- Tiwari, R.C. (2007) Geography of India, Prayag Pustak Bhawan, Allahabad.

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Semester-II

Value Added Course (VAC)-II

Course Code: BAR-VAC-211 **Course Title:** Digital and Technological Solutions **Credits: 2** **Contact Hour: 30** **Duration of Examination:2 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes:

- Knowledge about digital paradigm
- Realization of importance of digital technology, digital financial tools, e-commerce
- Know how of communication and networks.
- Familiarity with the e-governance and Digital India initiatives
- An understanding of use & applications of digital technology
- Basic knowledge of A1, machine learning and big data

Unit 1.	Introduction & Evolution of Digital Systems Role & Significance of Digital Technology Information & Communication Technology & Tools Computer System & it's working. Software and its types. Operating Systems Types and Functions Problem Solving Algorithms and Flowcharts
Unit 2.	Communication Systems: Principles, Model & Transmission Media Computer Networks & Internet: Concepts & Applications, Www, Web Browsers, Search Engines, Messaging, Email, Social Networking Computer Based Information System Significance & Types E-commerce & Digital Marketing: Basic Concepts, Benefits & Challenges
Unit 3.	Digital India & e-Governance Initiatives, Infrastructure, Services and Empowerment. Digital Financial Tools: Unified Payment Interface, Aadhar Enabled Payment System, USSD, Credit/Debit Cards, e Wallets,

Note for Paper Setting:

The question paper will be divided into two sections. Section A will carry 6 compulsory, objectives cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 6 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 8 marks (06+24=30).

Recommended books

- Sultan Chand & sons: Dhingra. LC (2020) Indian Economy, New Delhi.
- S. Chand & Co Ltd: Dutt, R. and Sundharam (2018): Indian Economy,., New Delhi.
- Sharda Pustak Bhawan: Gautam A (2009): Advanced Geography of India, Allahabad
- Godschalk. DR (etal) (1999): Natural Hazard Mitigation Recasting Disaster Policy and Planning Island Press, Washington, DC.
- Gore, M. S. (2002) Unity in Diversity The Indian Experience in Nation-Building, Rawat Publication Jaipur.
- Government of India. Economic Survey (Annual) Economic Division, Ministry of Finance. New Delhi
- K. Roy, L. Saunders and J. Kincaid (2006) (eds 1-A Global Dialogue on Federalism.Volume 3Montreal, Queen's Liniversity Press.

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Semester-III

List of Courses

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-301	Arabic Text and Grammar-III	4	40	60	100
BAR-MJR-302	Translation and Composition-I	4	40	60	100
Minor Course:					
BAR-MNR-303	Urdu (Mazmun Nigari and Khaka)	4	40	60	100
Multi-Disciplinary Course (MDC): III Any one of the following:					
BAR-MDC-304 BAR-MDC-305 BAR-MDC-306	• **English-III** • **Physical Education** (For the students of BA from the Department of Arabic) • **Arabic-III** (For the students of other schools)	3	30	45	75
Ability Enhancement Course (AEC): III Any one of the following:					
BAR-AEC- 307 BAR-AEC- 308 BAR-AEC- 309	1) Hindi-III 2) Persian-III 3) Gojri & Pahari languages-III	3	30	45	75
Skill Enhancement Course (SEC): III					
BAR-SEC-310	Communication skills	2	20	30	50
Value Added Courses (VAC): III (Optional)					
BAR-VAC-311	Physical Education & Yoga	2	20	30	50
	Total	**22**	**220**	**330**	**552**

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Semester III
Major-III

Course Code: BAR-MJR-301 **Course Title: Arabic Text and Grammar-III** **Credits: 4** **Contact Hours: 60** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this course the students will:

CO 1	Get acquainted with the basics of Arabic Language
CO 2	Have new vocabularies
CO 3	Be able to pronounce Arabic correctly
CO 4	Be able to understand the structure of sentences grammatically
CO 5	Develop their writing and speaking skills

الوحدة الأولى:

- ترجمة وشرح النصوص من الدرس الثالث عشر إلى الدرس السابع عشر
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدروس.

الوحدة الثانية:

- ترجمة وشرح النصوص من الدرس الثامن عشر إلى الدرس الخامس والعشرين.
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدرس.

الوحدة الثالثة:

- ترجمة وشرح الدروس: كيف أقضي يومي، في السوق، ماذا تحب أن تكون، الأمانة.
- تدريب الطلاب على النطق والكتابة حسب التمارين المذكورة فى الدرس.

الوحدة الرابعة:

- الجملة الفعلية: الفعل و الفاعل والمفعول به.
- الفعل اللازم والفعل المتعدي
- المفاعيل الخمسة: المفعول به، المفعول المطلق، المفعول لأجله، المفعول معه، المفعول فيه

الوحدة الخامسة:

- تصاريف أفعال الثلاثي المزيد فيه (اللازم)
- تصاريف أفعال الثلاثي المزيد فيه (المتعدي)

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Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

الكتب المقررة:

- الدكتور ف. عبدالرحيم : دروس اللغة العربية لغير الناطقين بها. الجزء الثاني : اسلامك فاؤنديشن ترست شنائي
- أبو الحسن على الندوي: القراءة الراشدة، الجزء الأول، مؤسسة الصحافة والنشر، لكناؤ، 2010
- علي الجارم: النحوالواضح ، دانش بك دبو ، متيا محل دهلي
- سراج الدين الندوي: تحفة الصرف(الجزء الثاني والثالث) ، مركزي مكتبه اسلامي ، دهلي

الكتب المقترحة:

8. سراج الدين الندوي: تحفة النحو(الجزء الثاني و الجزء الثالث)، مركزي مكتبه اسلامي ، نيو دلهي
9. مصطفى الغلايني: جامع الدروس العربية، مطبعة المصباح بيروت
10. وحيد الزمان الكيرانوي : القراءة الواضحة (الجزء الثاني) ، كتب خانه حسينيه ، ديوبند 2005
11. أبوالحسن علي الندوي : قصص النبيين للأطفال (الجزء الثاني)، مؤسسة الصحافة والنشر، لكناؤ
12. رفيع العماد فينان :ما يلزم من العربية، غود ورد بوكس نيو دلهي 1999م
13. كامل الكيلاني : مجموعة القصص العربية للأطفال ، المتكبة اليوسفيه ديوبند 2006

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Semester- III
Major-III

Course Code: BAR-MJR-302 **Course Title: Translation And Composition-I** **Credits: 4** **Contact Hours: 60** **Duration of Examination: 03 Hours**	**Maximum Marks:100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this course the students will:

CO 1	Know whole new set of words
CO 2	Gain the knowledge of both Arabic and English languages will be better
CO 3	Will be able to translate different kind of simple sentences
CO 4	Will have an idea how to draft letters and applications
CO 5	Be able to translate different types of passages

الوحدة الأولى :ترجمة الكلمات التالية إلى الإنجليزية:

- **بيت:** بناء، نافذة، شباك، غرفة الاستقبال، سرير، مخدة، فراش، قفل، ستار، مطبخ، آنية، أواني، القرن، موقد الغاز، ثلاجة، مصباح، غسالة، برادة، سخان، مكواة، ملابس، قميص، سروال، قلنسوة، فوطة، مرأة، صابون و غيرها.
- **المدرسة والكلية :** مدرسة، كلية، جامعة، المدرسة الابتدائية، المدرسة الثانوية، المدرسة العالية، روضة الأطفال، سبورة، طاولة، صف، تلميذ، طالب، معلم، مدرس، الأستاذ،سبورة، ممساح، محاة، قلم، كراسة، كتاب، دفتر، علامة، حقيبة، زميل فى الصف، مكْتب، مكتبة، قسم وغيرها.
- **وسائل النقل:** حافلة، سيارة، شاحنة، شارع، طريق، درب، سائق، تذكرة، قاطع التذاكر، موقف الباصات، سيارة الأجرة، موقف السيارات، قطار، طائرة، دراجة نارية، دراجة بخارية، دراجة، سيارة خاصة وإيرها.
- **السوق:** بقال، فاكهاني، خضري، ، بائع القماش، لبن، ملبنة، تفاح، عنب، موز، جوافة، كمثرى، مانجو، فجل، جزر، كرنب، كرنب ملفوف، بطاطس، طماطم، ثوب، قماش، خياط، فى، على، عن، من، إلى، فوق، تحت، قدام وغيرها.

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الوحدة الثانية: ترجمة الكلمات التالية إلى العربية:

Key, Courtyard, Ventilation, Kitchen, Garden, Lamp, Dustbin, Washroom, Brush, Toothpaste, Pen-stand, Staple, Staples, Ink, Inkpot, Furniture, Mate, Carpet, Cushion, Sofa, Balcony, Door-mate, Chair.

Summer, Winter, Heat, Cold, Weather, Cloth, Uniform, Nightdress, Handkerchief, Skirt, Court, Suit, Sweater, Curry, Bread, Butter, Dining table, Breakfast, Lunch, Dinner, Knife, Fork, Meat, Mutton, Chicken, Curd, Milk, City, Village, Resident, Police station, Traffic police, Doctor, Nurse, Big, Small, Short, Tall, Thin, Thick.

Engineer, Scavenger, Trader, Vender, Blacksmith, Mason, Carpenter, Barber, Banker, Goldsmith, Park, Airport, Railway station, Day, Night, Morning, Evening, Wheat, Mustard, Vegetables Maize, Corn, Walnut, Almond, Saffron, Peas, Cherry, Rain, Snow, River, Dam, Canal, Place, Flour, Pulses, Spinach, Onion, Ladyfinger, Bringal, Gourd, Pumpkin, Cucumber, Green peas etc.

الوحدة الثالثة: ترجمة الجمل العربية التالية إلى الإنجليزية:

الولد جالس، المدرس موجود، الكتاب جديد، القلم رخيص، العصفور جميل، الأسد نائم، البنت جالسة، المدرسة موجودة، الكراسة جديدة، الدجاجة جميلة، الأولاد جالسون، المدرسون موجودون، الكتب جديدة، الأقدام جديدة، العصافير جميلة، الأسدُ نائمة، المدرسات موجودات، الكراسات جديدة، الطاولات متينة، الدجاجات جميلة، الكتابان قديمان، الأسدان نائمان، الأستاذان واقفان، الكراستان جديدتان، البنتان جالستان، الطالبان مجتهدان، المصباحان مضيئان، البابان مفتوحان، الأستاذ واقف أمام السبورة، الطلاب جالسون على الكراسي، الطالبون كاتبون في الكراسة، الغرفة واسعة ونظيفة وغيرها.

هو ولد، هو رجل، هم أولاد، هم رجال، هي طباخة، هي طالبة، هن طباخات، هن طالبات ، أنت طالب، أنت بقال، أنتم طلاب، أنت بنت، أنت عاملة، أنتن بنات، أنتن عاملات، أنا مدرس، أنا مدرسة، نحن طلاب، نحن طالبات، نحن أستاذان، نحن معلمتان، هما ولدان، هما بنتان، نحن مسلمون، نحن مجتهدون وغيرها.

الوحدة الرابعة: ترجمة الجمل الإنجليزية التالية إلى العربية

The pen is costly, The table is old, The boy is standing, The teacher is decent, The bird is beautiful, The peon is standing, The door is closed, The window is open, doors are closed, Windows are open, The two pens are new, The two fans are working, Students are studious, The two boys are busy, The aeroplanes are at airport, The two boys are small, He is a man, He is a watchman, He is an officer, They are boys, They are workers, They are students, She is a cook, They are cooks (f) You are a student, You are studious, You are an Indian, She is a lady teacher, She is a girl, She is a cook, We are students, We are drivers, We are clerks, We are policemen, You are a gardener, You are nurses, You are doctor etc.

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الوحدة الخامسة: تدريب الطلاب على كتابة المقال والرسائل حول الموضوعات التالية.

المقال:

- البيت
- المدرسة
- العيد

الرسائل:

- كتابة الطلب للحصول على الإجازة
- كتابة الطلب للالتحاق بجامعة أو كلية
- طلب شهادة حسن السيرة والسلوك.

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Books recommended:

- S.A. Rahman. Teach yourself Arabic, Goodword, Nizamuddin, Delhi, 2006.
- S.A Rahman. Let's speak Arabic, Goodword, Nizamuddin, Delhi,2004
- Manzoor Ahmed Khan, Nahwal insha wa al-Tarjama,Moassasa Farhan li al Tiba e wa al Nashr, Sri Nagar, 2000.
- Mohd. Azam. Learn Arabic with Modern Techniques-I, Hind Publication, Matia Mahal, Jama Masjid, Delhi, 2014
- Mohd. Azam. Learn Arabic with Modern Technique-II, Hind Publication, Matia Mahal, Jama Masjid, Delhi, 2015
- Abdul Majid Nadwi, Muallimul Insha-I, Majlise Sahafa to Nashriat, Lucknow, 2002
- Abdul Majid Nadwi Muallimul Insha-II, Majlise Sahafa to Nashriat, Lucknow, 2002
- Amanulla Vadakkangara.Arabic Grammar, Goodword, Nizamuddin, Delhi,2011
- Rafi el-Imad Faynan. The Essential Arabic, 1998
- Hashim Muhammad, Arabic A step by step guide,. Part 1 First Edition 2013. Al-Qalam 28 Melbourne Road, Leicester, LE2

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Semester III
Minor-III

Course Code: BAR-MNR-303 **Course Title: Urdu –III** (Mazmoon Nigari & Khaka) **Credits: 4** **Contact hours: 60** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

This course will assist in:

CO 1	Introducing the students to the origin and development of Urdu prose
CO 2	Acuqinting them with the contribution of scholars like Sir Sayyed, Shibli and Hali to the development of Urdu prose
CO 3	Introducing them to Urdu Khaka Nigari
CO 4	Acuqinting them with the major writers of Khaka nigari
CO 5	Acuqinting them with the masterpieces of Khaka nigari

Unit I

۱۔اردو نثر: تعریف،آغاز وارتقاء

۱۔ مضمون نگاری کی تعریف

Unit II

۲۔ سرسید اور اردو لٹریچر (شبلی)

۳۔ " کندن" (رشید احمد صدیقی)

Unit III

۱۔ شبلی کے مختصر حالات زندگی اورمضمون نگاری

۲۔ سید اعجاز حسین کے مختصر حالات زندگی اور مضمون نگاری

Unit IV

۱۔خاکہ نگاری تعارف اور فن

۲۔میر تقی میر(محمد حسین آزاد)خاکہ مہدی نواز جنگ(صالحہ عابد حسین)

Unit V

۱۔محمد حسین آزاد کے حالات زندگی اور خاکہ نگاری

۲۔ صالحہ عابد حسین کے حالات زندگی اور خاکہ نگاری

Note for paper setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objectives – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

کتب برائے عمومی مطالعہ:

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* ارباب نثر اردو، سید محمد
*اردو اسیز، سید ظہیر الدین مدنی
* اردو میں خاکہ نگاری، صابرہ سعید
*اردو نثر کا آغاز وارتقاء
* اُردو ادب کی مختصر تاریخ، ڈاکٹر سید عبد اللہ
*اردو ادب کی مختصر تاریخ، ڈاکٹر اعجاز حسین
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Semester-III
Multi-Disciplinary Course (MDC)-III

Course Code: BAR-MDC-304 **Course Title: English-III** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes:

The course is included in the syllabi to:

CO 1	Make the students understand the importance of communication and conversational skills.
CO 2	Expose students to the basics of short story.
CO 3	Encourage students to understand social and moral issues through literature.
CO 4	Make the students embrace literature as the source of wisdom, spiritual insight, and aesthetic pleasure.
CO 5	Enhance their ability to communicate ideas logically and to adjust writing style appropriately according to the content.

Unit I: Prose

- 'A Chat with Mrs. Smiles' by W.R.Lee

Unit II: Short Story

- 'An Astrologer's Day' by R.K Narayan

Unit III: Poetry

- An Old Woman by Arun Kolatkar

Unit IV: Novel

- *Coolie* by Mulkh Raj Anand
- Narration

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objectives – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Books Prescribed:

1. *Timeless Thought*, Orient Black swan Private Limited, New Delhi 2010
2. Thaker, P.K and others, *Developing English Skills*, Oxford University Press New Delhi, 200
3. *A Kaleidoscope, selection of English Poetry*, published by University Press, Hyderabad

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4. *English & Communications Skill*, Book-II Kuldeep Jaidka, Alwinder Dhillon, Parmod K. Singh

Books Recommended:

1. Norman Lewis, Speak Better Write Better English, New Delhi,2008
2. Johnson A.J. and A.V. Martinet, A practical English Grammar , E.L.B.S. Edition
3. Koul, Nina, Chinar I Rew Anand publications
4. Nissim Ezekel, A book on Miscellaneous point
5. Raymond Murphy, Advanced English Grammar, University Cambridge University press.
6. Wren & Martin, revised by N.D.V. Prasad, High School English Grammar, S. Chand & Company Ltd., 1997.

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Semester III

Multi-Disciplinary Cours (MDC)-III

Course Code: BA-MDC-305 **Course Title: Leadership Skills in Management** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

Course Outcomes: On successful completion of the course, the students will be able:

- To improve speaking and listening skills in communication,
- To learn about effective use of non-verbal communication skills.
- To develop social skills
- To know about basic rules of business etiquette.

Unit – 1	**Introduction to Leadership:** Definition and significance of leadership, Distinction between leadership and management, Historical overview of leadership theories, Contemporary approaches to leadership, Trait theory of leadership, Behavioral theories of leadership, Situational and contingency theories, Transformational and transactional leadership, Authentic and servant leadership.
Unit - 2	**Personal Leadership Development:** Self-awareness and emotional intelligence, Values, ethics, and integrity in leadership Goal setting and self-motivation, Time management and personal productivity, Resilience and stress management, Rational and intuitive decision-making processes, Ethical decision making
Unit - 3	Organizational culture and its impact on leadership, Leadership styles and their influence on culture, Fostering a culture of innovation and learning, Leading organizational change, Managing resistance to change.
Unit – 4	Team formation and stages of development, Roles and responsibilities within teams, Establishing team norms and expectations, Managing conflicts within teams, Team performance evaluation and improvement.

Recommended book(s)

- Achua, Lussier, Effective Leadership ,CENGAGE .
- A. Chandramohan, Leadership and Management, Himalaya .
- Gary Yukl, Leadership in Organisation ,Pearson .
- Peter G. Northhouse ,Introduction to Leadership, Concepts & practices,SAGE.
- Afsaneh Nahavandi ,The Art & Science of Leadership ,Prentice Hall.

Note for Paper Setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 08 long answer type questions, two from each unit. The students will be required to answer 04 questions, one from each unit, each question carries 10 marks.

Semester- III

Multi-Disciplinary Course (MDC)-III

(for the students of other schools)

Course Code: BAR-MDC-306 **Course Title: Arabic-III** **Credits: 3** **Contact Hours: 48** **Duration of Examination: 2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Minimum Pass Marks: 18**

	Course Outcomes
CO 1	Learn the names of various types of animals
CO 2	Get equipped with new vocabularies
CO 3	Know the day to day life related subjects
CO 4	Learn further basic of Arabic Grammar and read texts that will improve understanding of Arabic

Unit-I (Oral Expression)

- Name of animals, our helpers, action words
- Name of birds and reptiles
- My village
- My school

Unit-II (Oral expression)

- A picnic spot
- Travelling by aero plane
- At the book fair
- At Sunday market

Unit-III (Arabic Grammar)

- Personal Pronouns and their uses
- Simple nominal and verbal sentences
- Adjectives
- Conjugation of اسم الفاعل واسم المفعول from trilateral verbs

Unit- IV (Arabic Text)

- From Lesson 14-16
- From lesson -17-19

Prescribed Book:

- **My Arabic Reader**, Elementary Level, By Dr. Wali Akhter Nadwi, ISRA, New Delhi 2019

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Recommended Books:

6. Duroosullugha al Arabiyyah, Dr. V Abdur Rahim, Islamic Foundation Cheeanai.
7. Al Nahwul Wadeh, Ali al Jarim, Danish Bookdepo, Matia Mahal, Delhi
8. Kitabu Nahw, Abdur Rahman Amratsari, Danish Bookdepo, Matia Mahal, Delhi
9. Kitabus Sarf, Abdur Rahman Amratsari, Danish Bookdepo, Matia Mahal, Delhi
10. Tohfatunnahw, tohfatussarf, Sirajuddin Nadvi, Markazi Maktaba Islami, New Delhi

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Semester-III

Ability Enhancement Course (AEC)-III

Course Code: BAR-AEC- 307 **Course Title: Hindi-III** **Credits: 3** **Contact Hours: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes:

It aims to make the students:

CO 1	To understand the history of Adi Kal in detail
CO 2	Theory of Madhya Kal in details
CO 3	History of Bhakti Kaleen and Riti Kaleen Kavi
CO 4	To introduce the poetry of Kabir

हिंदी की पद्य विधाएँ

Unit 1:

- आदिकाल / वीरगाथाकाल :नामकरण और काल विभाजन
- सिद्ध साहित्य, जैन साहित्य, रासो साहित्य, नाथ साहित्य

Unit 2:

- मध्यकाल : पूर्व मध्यकाल (भक्तिकाल)
- उत्तर मध्यकाल : रीतिकाल

Unit 3 :

- भक्तिकालीन निर्गुण-सगुण धाराएँ
- रीतिकालीन काव्य: पृष्ठभूमि, नामकरण एवं धाराएं

Unit 4 :

- निर्गुण काव्य : कबीर की विचार चेतना
- कबीर का काव्य शिल्प

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

Prescribed Books:

1. कबीर- हजारीप्रसाद द्विवेदी
2. बिहारी रत्नाकर-जगन्नाथदास रत्नाकर

Recommended Books:

1.हिंदी साहित्य का इतिहास- रामचंद्र शुक्ल
2.हिंदी साहित्य युग और प्रवृत्तियां - डॉ. शिवकुमार शर्मा

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Semester -III

Ability Enhancement Course (AEC)-III

Course Code: BAR-AEC- 308 Course Title: Persian-III Credits: 3 Contact Hours: 48 Duration of Examination:2.5 Hours	Maximum Marks : 75 University Examination: 45 Sessional Assessment: 30 Pass Marks: 18

Course Outcomes

The students will:

CO 1	Learn about tenses and its kinds
CO 2	Learn verbs and its kinds
CO 3	Learn the degree of adjectives
CO 4	Learn new vacublaries

UNIT- I

- Tenses and its Kinds
- Verbs and its kinds
- Degree of Adjectives

UNIT- II

- Present Tense
- Future Tense
- Imperative sentences

UNIT - III

Text book

- Saffar Muqaddam Dr Ahmad Zaban –e-Farsi. Council for the promotion of Persian language and Literature .Tehran.IranVol.II Lesson no 1 to 8

UNIT - IV

Text book:

- Saffar Muqaddam Dr Ahmad Zaban –e-Farsi. Council for the promotion of Persian language and Literature .Tehran.IranVol.II Lesson no 9 to 16

Note for Paper setting

- The question paper will be divided into two sections. **Section A** Will carry 09 compulsory- objective –cum short answer type questions, two from each unit . each Carrying 01 marks **Section B** will have **08 questions** two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45)**

Book Prescribed:

- Saffar Muqaddam Dr Ahmad Zaban –e-Farsi. Council for the promotion of Persian language and Literature .Tehran.IranVol.II Lesson no 9 to 16

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Books Recommended:

1. Saffar Muqaddam. Dr. Ahmed :Zaban-e –Farsi. Council for the promotion of Persian language and literature. Tehran. Iran . Vol.1
2. Azfa_ Vol: I by YadullahSamareh
3. Elementary Persian Grammar by Rajinder Kumar

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Semester- III

Ability Enhancement Course (AEC)-III

Course Code: BAR-AEC- 309 **Course Title:** Gojri& Pahari Folklore گوجری تے پہاڑی لوک ادب **Credits: 3** **Contact Hours: 48** **Duration of Examination:2.5 Hours**	**Maximum Marks : 75** **University Examination: 45** **Sessional Assessment: 30** **Pass Marks: 18**

Course Outcomes

The students will:

CO 1	Gojri poetic folk literature
CO 2	Gojri prose folk literature
CO 3	Pahari poetic folk literature
CO 4	Pahari prose folk literature

UNIT I: GojriFolklore	**یونٹ 1:** گوجری لوک ادب
• Historical Background (1700-1900 CE)	تاریخی پس منظر تے قِسم
• Social & Seasonal Songs	خوشی غمی کا گیت تے موسمی گیت
• Stories of Vallour& Love: Barsio/ Maryam	گوجری لوک بار: برسیو، مریاں ڈھینڈی
UNIT II: Gojri Folk Tales	**یونٹ 2:** گوجری، نثری لوک ادب
• Gojri Folk Tales	لوک کہانیں تے داستان
• Proverbs	اکھان تے کہاوت
• Idioms/riddles etc.	محاورا، بجھارت تے کِت
UNIT III: Pahari Folklore-I	**یونٹ 3:**پہاڑی لوک ادب1
• **Pahari Folklore- General Introduction**	پہاڑی لوک ادب نا عمومی جائزہ تے قسماں
• Pahari Folk-Tales	پہاڑی لوک کہانیاں
• Pahari Idioms & Proverbs	پہاڑی اکھان تے محاورے
UNIT IV: Pahari Folklore-II	**یونٹ 4:**پہاڑی لوک ادب2
• Pahari Folk-Songs	پہاڑی لوک گیتاں نا عمومی جائزہ
• Festive & Seasonal Songs	موسمی تے خوشی غمی نے گیت
• Pahari Epics: Shams &Rajwali	لوک بار: شمس‌ملدیال تے راج ولی

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 09 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **08 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 09 marks **(09+36=45).**

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	RECOMMENDED BOOKS :	
		ڈاکٹر رفیق انجمؔ: گوجری ادبیات
		ڈاکٹر جاوید راہی : لوک ورثو
		ڈاکٹر غلام حسین اظہرؔ: گوجری پہاڑی لوک گیت
		مہارو ادب (لوک ادب نمبر) جموں و کشمیر کلچرل اکیڈمی
		راجہ نذر بونیاری : پہاڑی زبان و ادب دی تاریخ
		شیرازہ پہاڑی(لوک ادب نمبر) جموں و کشمیر کلچرل اکیڈمی
		راجہ نذر بونیاری : پہاڑی زبان و ادب دی تاریخ
		مہارو ادب (ثقافت نمبر) کلچرل اکیڈمی
		منشاء خاکی : نثر بہار
		ڈاکٹر رفیق انجمؔ: گوجری کہاوت کوش

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Semester-III
Skill Enhancement Course (SEC)-III

Course Code: BA-SEC- 310 **Course Title: Creative Writing in Business** **Credits: 2** **Contact Hour: 30** **Duration of Examination:2.5 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes: On successful completion of the course, the students will be able to:

- Explain the basic essence of creative writing in the contemporary business world.
- Understand the process and techniques for effective creative writing.
- Understand how to organize creative writing ideas.
- Recognize basic structuring of paragraphs.
- Adopt mechanisms for different kinds and formats of writings for business communication.
- Describe effective interpretations of various types of writings.

Unit - 1	Creativity: Introduction and Characteristics of Creativity, features of creativity, Creative writing, various types of creative writing, Techniques used in creative writing, process of business writing, Writing Process in the Workplace, Applying the Communication Process, Imagination & Writing- Peer-interaction, Activities on Imagination, Craft of Writing- Figure of Speech, Word Play, Character Creation.
Unit - 2	Organizing writing Ideas, Headings, Subheading and Lists, Writing Effective Paragraphs: Structuring a Paragraph, Organizing Within Paragraphs, Paragraph Transitions, Reverse Outlining: Creating a Reverse Outline, working with the Results of Reverse Outline, Proofreading & Editing: Proofreading & Editing of different types of writing, analysis, and interpretation of different works in Literature, Creative Writing & Media.
Unit - 3	Writing Emails, Memos, Letters: Memos; Introduction and format for Memos, organizing memos, Style and Tone of writing memos, Common Memo Writing Situations, Business Letters; types of business letters, Elements of a business letter, samples of various types of business letters, Writing Business Emails; types of business emails, writing effective business emails, formats of various types of business emails, principles of writing instant messages..

Recommended Book(s)

- Adelstein, Michael E. "Contemporary Business Writing" (1971) by New York, Random House, Publications
- Peter Hartley and Clive G. Bruckmann (2002), "Business Communication" by Routledge, London, UK
- Andrews, P.H. and Herschel, R.T. (1996) Organizational Communication: Empowerment in a Technological Society. Boston, MA: Houghton Mifflin.
- Angell, D. and Heslop, B. (1994) The Elements of E-mail Style. Reading, MA: Addison Wesley.
- Bovee, C.L. and Thill, J.V. (1995) Business Communication Today, 4th edition. New York: McGraw-Hill.

Note for Paper Setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The Internal Assessment assessments for 2 credit course will be 20.

Semester-III
Value Added Course (VAC)-II

Course Code: BA-VAC-311 **Course Title:** Physical Education & Yoga **Credits: 2** **Contact Hour: 30** **Duration of Examination:2.5 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Objectives: This course has been designed with the objective to make the students understand the basic principles of yoga, including the history, philosophy, physical postures and it's misconceptions.

Course Outcomes:

- *CO-1:* Students will be able to identify the different types of yoga and their benefits.
- *CO-2:* Students will be able to improve their flexibility, strength and balance.
- *CO-3:* Students will be able to reduce stress and anxiety by performing relevant yoga practices.
- *CO-4:* Students will be able to identify the relevance of healthy food habits.

Unit – 1	***Introduction to Yoga:*** Definition of Yoga, History of Yoga, Terminology of Yoga, Aims and Objectives of Yoga, Benefits of Yoga, Types / Streams of Yoga, Journey of Yoga from India to the World. Ashtang Yoga.
Unit – 2	***Yoga and Yoga Practices:*** Shatkarma - Meaning, Purpose, Procedure and their Significance in Yoga Sadhna ; Mudra and Bandha – Meaning, Procedure, Types, Precautions and Health Benefits ; Yogasanas - Meaning, Procedure, Principles, Types, Precautions and their Health Benefits ; Pranayama and Dhayana - Meaning, Procedure, Types, Precautions and their Health Benefits ; Yogic Management of Stress and its Consequences.
Unit – 3	***Yoga Philosophy on Diet and Health:*** Concept of Aahara (Diet) according to Yogic Text, Significance of Hath Yoga practices in Health promotion, Concept of mental health well-being according to Patanjali Yoga, Yogic practice of Patanjali Yoga, Importance of Subjective experience in daily Yoga Practice, Yoga in prevention of common disease – Obesity, Hypertension, Low Back Pain, Bronchial Asthma, Arthritis.

Recommended Book(s):

- Iyengar Yoga For Beginners, B.K.S. Iyengar, Penguin UK (3 August 2006)
- Patanjali's Yoga Sutras, Swami Vivekananda, Fingerprint! Publishing (1 October 2019)
- Yoga for Everyone: 50 Poses for Every Type of Body, Dianne Bondy, DK (10 June 2019)

Note for Paper Setting: The question paper will be divided into two sections. Section A will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The Internal Assessment assessments for 2 credit course will be 20.

Semester-IV
List of Courses

Course Code	Course Title	Credits	Distribution of Marks		
			Sessional Assessment	University Examination	Total
Major Course:					
BAR-MJR-401	Arabic Text –IV	4	40	60	100
BAR-MJR-402	Arabic Grammar-IV	4	40	60	100
BAR-MJR-403	Translation and Composition: II	4	40	60	100
BAR-MJR-404	History of Arabic Literature: I	4	40	60	100
Minor Course:					
BAR-MNR-405	Urdu Novel	4	40	60	100
Value Added Course (VAC): IV (Optional)					
BAR-VAC-406	NSS	2	20	30	50
	Total	**22**	**220**	**330**	**550**

- **Semester-IV, Exit Option:** (Diploma, UG Level)

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Semester-IV
Major-IV

Course Code: BAR-MJR-401 **Course Title: Arabic Text-IV** **Credits: 4** **Contact Hours: 60** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

This course will:

CO 1	Introduce the students to the simple pros pieces of Arabic
CO 2	Help them build their vocabulary
CO 3	Assist them in pronouncing Arabic correctly
CO 4	Make them understand the structure of sentences grammatically
CO 5	Help them in developing writing and speaking skills

الوحدة الأولى:

- لما بلغت السابعة من عمري
- النملة
- الصيد

الوحدة الثانية:

- الطائر
- سفر القطار
- أصدقائي

الوحدة الثالثة:

- مأدبة
- بر الوالدين
- فضيلة الشغل

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الوحدة الرابعة:

- قريتي
- ترنيمة الليل
- أدب الأكل والشرب

الوحدة الخامسة:

- يوم مطير
- البريد 1
- البريد 2
- يوم العيد

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective– cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

الكتاب المقرر: أبوالحسن علي الندوي: القراءة الراشدة . الجزء الأول، مؤسسة الصحافة والنشر لكناؤ 2010

الكتب المقترحة:

1. وحيد الزمان الكيرانوي: القراءة الواضحة ، الجزء الثالث ، كتب خانه حسينيه ، ديوبند
2. الدكتور عبد الرحمن رافت الباشا: صور من حياة الصحابة الجزء الثاني والثالث، مؤسسة الصحافة والنشر لكناؤ
3. عبد الفتاح الصبري: القراءة الرشيدة ، الجزء الثاني و الثالث، مكتبه خدمت متيا محل دلهي
4. أبو الحسن علي الندوي: قصص النبيين للأطفال ، الثالث و الرابع ، مؤسسة الصحافة والنشر ، لكناؤ

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Semester- IV
Major-IV

Course Code: BAR-MJR-402 **Course Title: Arabic Grammar-IV** **Credits: 4** **Contact hours: 60** **Duration of Examination: 03 Hours**	**Maximum Marks:100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this course the students will:

CO 1	Get introduced to the new lessons on syntax and morphology
CO 2	Gain knowledge of basic syntactic structure of Arabic.
CO 3	Know the necessary information on correct word order and usage of Arabic particles, nouns and verbs.
CO 4	Be able to understand the grammatical patterns and be aware of grammatical errors
CO 5	Develop a reasonable taste of Arabic language

علم النحو

الوحدة الأولى:

- الحال والتمييز
- العدد والمعدود من حيث التذكير والتأنيث والإعراب

الوحدة الثانية:

- إن وأخواتها
- كان وأخواتها

الوحدة الثالثة:

- أفعال المقاربة
- أفعال المدح والذم

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علم الصرف

الوحدة الرابعة:

- تصاريف أفعال المهموز من أبواب الثلاثي المجرد (ستة أبواب) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)
- تصاريف أفعال المضاعف من أبواب الثلاثي المجرد (ستة أبواب) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

الوحدة الخامسة:

- تصاريف أفعال المهموز من أبواب الثلاثي المزيد (اثنا عشر بابا) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)
- تصاريف أفعال المضاعف من أبواب الثلاثي المزيد (اثنا عشر بابا) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

الكتب المقترحة:

1. علي الجارم :النحوالواضح، دانش بك دبو متيا محل دلهي
2. مصطفى العلايني : جامع الدروس العربية، مطبعة السعادة ، بيروت
3. سراج الدين الندوي: تحفة النحو و الصرف(من الجزء الاول الى الجزء الثالث) ، مركزي مكتبه اسلامي ، نيودلهي
4. أحمد الحملاوي: شذا العرف ، شركة ومطبعة مصطفى البابي الحلبي 1940م
5. رفيع العماد فينان: ما يلزم من العربية ، غود ورد بوكس نيو دلهي 1999م

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Semester- IV
Major-IV

Course Code: BAR-MJR-403 **Course Title: Translation and Composition: IV** **Credits: 4** **Contact hours: 60** **Duration of Examination: 03 Hours**	**Maximum Marks:100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

After completing this course, the students will:

CO 1	Find that they are more enriched in terms of new vocabularies
CO 2	Have a better grip of Arabic and English languages
CO 3	Be able to translate different kind of passages
CO 4	Know how to compose articles
CO 5	Know how to draft letters and applications

الوحدة الأولى:- ترجمة الكلمات التالية إلى الإنجليزية:

- السقف، السطح، الجدار، الطابق، الخوان، سفرة، سجادة، الديوان، مروحة، مروحة السقف، الساعة، ساعة الحائط، زهرية، ازهار، وردة، الفل، صفصاف، شجر، غصن، محكمة، مهنة، رئيس، مصنع، ميدان، فندق، حرف يدوية، على العكس، عجلة الحصان، طعام رئيسي، مديرية، ولاية، متاع، سوق، مستهلكات، شراء، بيع، حوائج، منسوجات، منطقة، ريف، نفقات، راكب، يمين، شمال، جنوب، شرق، ازدحام وغيرها.
- الصحيفة، الجريدة، المجلة، الدورية، الحزب، السياسة، الحزب السياسي، البرلمان، عضو، عضو البرلمان، الرئيس، الوزير، كبير الوزراء، المدير وغيرها.
- رئيس القسم، صالة الانتظار، المكتبة العامة، مديرالمكتبة، مدير الجامعة، المسجل، عميد الإدارة، السكن، الموعد، المادة، رقم المادة، رقم الجلوس، أستاذ المادة وغيرها.
- العام الدراسي، مراقب الامتحانات، هزة الأرض، زلزال، فيضانات، مرض، مريض، الدواء، العلاج، الحبوب، الحقنة، زراعة التفاح، عمل الأطفال، زراعة البن، مصنع المنسوجات، صناعة السياحة، انتاج القمح، حقيبة مدرسية، كتب مدرسية، مناهج دراسية، تعليم الزامي، مدرسة حكومية، مدرسة عالية،

Md. Affan

Manzar Ali

مدرسة خاصة، طالب أجنبي، طالب محلي، طالب نظامي، طالب جامعي، جامعة مركزية، جامعة ولائية وغيرها.

- الوحدة الثانية:- ترجمة الكلمات التالية إلى العربية:

Father, mother, sister, brother, son, daughter, uncle, cousin, nephew, niece, Grandmother, Grand Father, Grand Son, Grand Daughter, Marriage, Divorce, family member, guardian, Sister-in-law, Brother-in-law, Son-in-law, Father-in-law, Mother-in-law, children park, Zoo, communication, heart attack, private clinic, government dispensary, medical examination, blood group, blood pressure, communal harmony, world terrorism, general strike, police inspector, traffic inspector, firing, curfew, emergency, bomb blast, cold war, hot war, pleasant weather, Indian army, defense minister, minister of labor, minister of comers etc.

الوحدة الثالثة:- ترجمة الجمل التالية إلى الإنجليزية:

هذا ولد، هؤلاء رجال، هذا أسد، هذا كتاب، هذه سبورة، هذه كراسة، هؤلاء أولاد، هؤلاء بنات، هذه كتب، هذه أسد، هذه سبورات، هذه كراسات، ذلك موظف، ذلك كرسي، ذلك كلب، تلك مدرسة، تلك طاولة، تلك كلبة، أولئك موظفون، أولئك مدرسات، تلك طاولات، تلك كلاب، هذا القلم جديد، هذا الرجل مهندس، هذه البنت طالبة، هذه الأقلام جديدة، هؤلاء الرجال مهندسون، هؤلاء البنات طالبات، ذلك القلم قديم، هذا الرجل مجتهد، تلك الكتب قديمة ، أولئك النساء مجتهدات، أولئك الرجال مهندسون، ما هذا؟ ما ذلك؟ هل هو ولد؟ هل هؤلاء اولاد؟ وغيرها.

هذا شنكر، شنكر طالب في مدرسة في دلهي، لشنكر أصدقاء كثيرون في المدرسة، هؤلاء نبيل ومحمد جوزوف، هم أصدقاء شنكر، زينب أيضا طالبة في هذه المدرسة، هؤلاء راني و لالي و ممتا، هن صديقات زينب، لزينب صديقة حميمة في مدينة كولكتا، هذان أسدان، هذان ولدان، هذان رجلان، هاتان بنتان، هاتان زهرتان، هاتان طالبتان، تانك مدرستان، تانك عاملتان، تانك طباختان، ذنك كلبان، ذنك رجلان، ذنك ديكان وغيرها.

الوحدة الرابعة:- ترجمة الجمل التالية إلى العربية:

This is a pen, this is an inkpot, this is girl, this is note book, these are teachers, these are students, these are sparrows, these are tables, that is a cow, that is a horse, That is a camel, That is a lamp, that is a news paper, that is an envelope, that is a pen stand, that is a key, that is a bicycle, these are women, these are girls, these are air hostess, these are servants, these are chairs, these are baskets, these are pens, these are gardens, those are students, those are boys, those are girls, those are doorkeepers, those are drivers, those are stones, those are heaters, those are cats, those are refrigerators, those are cups, those are buildings, those are watchmen, those are universities.

Md. Affan

Manzoor Ali

This is a boy, that man is tall, that woman is tall, that boy is short, that boy is handsome, this girl is a student, this table is cheap, this chair is durable, those buildings are beautiful, those books are interesting, those teachers are available, those rooms are locked, those stories are interesting, those rooms are spacious, that bird is a crow, this man is a tailor, these boys are lazy etc.

الوحدة الخامسة: تدريب الطلاب على كتابة المقال والرسائل حول الموضوعات التالية:

المقال:

- الجامعة،
- السوق
- عيد الأنوار.

الرسائل:

- رسالة والد من ولده يحثه على الجهد والاجتهاد في القراءة،
- تهنئة بمناسبة زواج صديق
- طلب استشراك في مجلة.

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Books recommended:

- S.A. Rahman. Teach yourself Arabic, Goodword, Nizamuddin, Delhi, 2006.
- S.A Rahman. Let's speak Arabic, Goodword, Nizamuddin, Delhi,2004
- Manzoor Ahmed Khan, Nahwal insha wa al-Tarjama,Moassasa Farhan li al Tiba e wa al Nashr, Sri Nagar, 2000.
- Mohd. Azam. Learn Arabic with Modern Techniques-I, Hind Publication, Matia Mahal, Jama Masjid, Delhi, 2014
- Mohd. Azam. Learn Arabic with Modern Technique-II, Hind Publication, Matia Mahal, Jama Masjid, Delhi, 2015
- Abdul Majid Nadwi, Muallimul Insha-I, Majlise Sahafa to Nashriat, Lucknow, 2002
- Abdul Majid Nadwi Muallimul Insha-II, Majlise Sahafa to Nashriat, Lucknow, 2002
- Amanulla Vadakkangara.Arabic Grammar, Goodword, Nizamuddin, Delhi,2011
- Rafi el-Imad Faynan. The Essential Arabic, 1998
- Hashim Muhammad, Arabic A step by step guide,. Part 1 First Edition 2013. Al-Qalam 28 Melbourne Road, Leicester, LE2

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Md. Aftab

Manzar Ali

Semester- IV
Major-IV

Course Code: BAR-MJR-404 **Course Title: History of Arabic Literature-I** **Credits: 4** **Contact hours: 60** **Duration of Examination: 03 Hours**	**Maximum Marks:100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

Through this course the students:

CO 1	Will know the developments in Arabic literature in their chronological order
CO 2	It will aquint them with major historical developments of different periods
CO 3	Introduce them to poets & writers who enriched Arabic language and literature
CO 4	Will be introduced to the social, political and cultural history of pre-Islamic and Islamic periods
CO 5	Will gain knowledge of the developments in different spheres of life there

الوحدة الأولى: العصر الجاهلي

- الأعصر الأدبية: تعريف موجز
- الكتابة في هذا العصر
- النثر: الأمثال والحكم والتوقيعات

الوحدة الثانية: العصر الجاهلي

- الخطابة وأهم الخطباء في هذا العصر
- المعلقات: أهميتها، عددها، أصحابها
- أهم شعراء المعلقات: امرؤ القيس، زهير، عنترة (حياتهم وشعرهم

الوحدة الثالثة: العصر الإسلامي

Md. Affan

Manzar Ali

- النثر: تعريف مؤجز
- القرآن الكريم: جمعه وتدوينه وأثره في اللغة
- الحديث الشريف: أهميته في اللغة والأدب

الوحدة الرابعة: العصر الإسلامي

- الشعر: تعريف موجز
- شعراء الرسول صلى الله عليه وسلم: حسابن ثابت، عبد الله بن رواحه، كعب ابن زهير رضي الله عنهم (حياتهم وشعرهم)
- الخنساء رضي الله عنها (حياتها وشعرها)

الوحدة الخامسة: العصر الأموي

- الخطابة في هذا العصر، أهم الخطباء: تعريف موجز
- شعراء النقائض: جرير، أخطل، فرزدق
- شعر الغزل وأهم شعرائه: جميل بن معمر، عمر بن ربيعة (حياتهما وشعرهما)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objectives – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Books Recommended:

1. Ahmed Hassan al-Zayyat, Tarikh –ul-Adab –al-Arabi
2. Butt, Gerald, The Arab World
3. Abdul Haleem Nadwi, Arabi Adab Ki Tareekh, NCPUL, New Delhi, 2004
4. Hanna Fakhouri, Tarikh al-Adab al-Arabi, Dar al Jeel, Bairut, 1986
5. Ahmed Hasan al-Zayyat, Tarikh –al-Adab –al-Arabi, Al- BAlagh Publications, Abul Fazal Enclave, Jamia Nagar, New Delhi
6. Shams Kamal Anjum "Arabi Nas'r ka Fanni Irteqa" Urdu Translation of Al Fann wa Mazahibohu fi al Nasr Al Arabi. Al Kitab International New Delhi 2012
7. Shaoqi Zaif, Al Fann wa Mazahibo hu fi al Nasr Al Arabi, Dar al Ma'arif. Misr, 2003
8. Shaoqi Zaif, Tarikh al-Adab al-Arabi, Dar al Maarif, Cairo, 1960
9. Umar Farrookh, Tarikh al-Adab al-Arabi, Dar al Ilm Lil Malaayeen, Bairut, 2006

Md. Affan

Manzoor

Semester IV
Minor-IV

Course Code: BAR-MNR-405 **Course Title: Urdu –IV (Urdu Novel)** **Credits: 4** **Contact hours: 60** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

Course Outcomes:

The paper aims at:

CO 1	Introducing the students to the origin and development of Urdu novel
CO 2	Acquainting them with the components of novel
CO 3	Acquainting them with the difference between novel and novella
CO 4	Introducing them to the masterpieces of Urdu novel
CO5	Introducing them to the great figures of Urdu novel

Unit: I

- اردو ناول تعریف،آغاز و ارتقاء
- اردو ناول،اجزائے ترکیبی
- ناول اور ناولٹ میں فرق

Unit:II

- مولوی نذیر احمد حالات زندگی اور ناول نگاری
- منشی پریم چند حالات زندگی اور ناول نگاری
- ناول"گؤدان،،(منشی پریم چند) عمومی مطالعہ

Unit: III

- کرشن چندر حالات زندگی اور ناول نگاری
- عصمت چغتائی حالات زندگی اور ناول نگاری
- ناول"مٹی کے صنم،، عمومی جائزہ

Unit: IV

- جدید اردو ناول،سرسری جائزہ
- ناول "آگ کا دریا،، عمومی جائزہ
- ناول"اُمراؤ جان ادا،، سرسری جائزہ

Unit: V

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- تقسیم ہند اور اردو ناول،عمومی جائزہ
- ناول" ایوان غزل،، (جیلانی بانو)سرسری مطالعہ
- ناول"کئی چاند تھے سر آسماں،،(شمس الرحمن فاروقی) عمومی جائزہ

Note for paper setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

کتب برائے عمومی مطالعہ:

* احسن فاروقی: اردو ناول کی تنقیدی تاریخ،
* فرمان فتح پوری : اردو نثر کا ارتقاء،
* یوسف سرمست : بیسویں صدی میں اردوناول،
* ڈاکٹر قمر رئیس : پریم چند کا تنقیدی مطالعہ،
* وقار عظیم : فن افسانہ نگاری،
* ڈاکٹر ایم کے وقار : اُردو ناول (آزادی سے پہلے اور بعد)

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Md. Affan

Manzar Ali

Semester-IV
Value Added Course (VAC)-IV (Optional)

Course Code: BA-VAC-406 **Course Title:** NSS **Credits: 2** **Contact Hour: 30** **Duration of Examination:2.5 Hours**	**Maximum Marks : 50** **University Examination: 30** **Sessional Assessment: 20** **Pass Marks: 12**

Course Outcomes:

- Understand the community in which they work and their relation
- Identify the needs and problems of the community and involve them in problem-solving
- Develop capacity to meet emergencies and natural disasters

Unit - 1	**National Service Scheme** a. History and its Objectives b. Organizational structure of N.S.S. at National, State, University and College Levels c. Advisory committee and their functions with special reference to college principal,Programme officer, N.S.S. group leader and N.S.S. volunteers in the implementation.
Unit - 2	**National Integration** A) Need of National integration B) Various obstacles in the way of National Integration; such as caste, religion, languageand provisional problems etc. **Special Programme** A) Legal awareness B) Health awareness C) First-aid D) Career guidance E) Leadership training - cum - Cultural Programme F) Globalization and its Economic Social Political and Cultural impacts.
Unit - 3	**Special Camping programme** A) Nature and its objectives B) Selection of camp site and physical arrangement C) Organization of N.S.S. camp through various committees and discipline in the camp. D) Activities to be undertaken during the N.S.S. camp. E) Use of the mass media in the N.S.S. activities.

Recommended Book(s):

- National Service Scheme Manual, Government of India.
- Training Programme on National Programme Scheme, TISS.
- Orientation Courses for N.S.S. Programme officers, TISS.
- Case material as Training Aid for field workers, *Gurmeet Hans.*
- Social service opportunities in Hospitals, *Kapil K.Krishan*,TISS.
- Social Problems in India, *Ram Ahuja.*

Note for Paper Setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The Internal Assessment assessments for 2 credit course will be 20.

COLLEGE OF NURSING RAJOURI
School of Nursing & Biomedical Science
Baba Ghulam Shah Badshah University Rajouri UT of Jammu & Kashmir
Established by Government of Jammu & Kashmir
Recognized by UGC under section 2(f) & 12(B)

Ref. No: BGSBU/CONR/22/315

Dated: 06/09/2022

To

The Dean Academic Affairs

BGSB University

Rajouri

Through Proper Channel (OSD Nursing Colleges)

Subject: Submission of Documents following the completion of the II[nd] Board of Studies Meeting Conducted on 26[th] August 2022.

Sir,

With regard to the above-mentioned subject, I am hereby submitting the documents following the II [nd] Board of Studies meeting conducted successfully on 26[th] August 2022. Kindly see the enclosed documents for your reference.

Thanking you,

Yours faithfully,

Dr. Titi Xavier PhD. (N)
(Dr. Titi Xavier) Ph.D. (N)
Associate Dean
Associate Dean
School of Nursing and Biomedical Sciences
School of Nursing & Biomedical Sciences
BGSB University
BGSB, University Rajouri

List of Encl:

01. Copy of INC syllabus (Revised syllabus)
02. Minutes of BOS
03. Agenda
04. List of Annexures (08 Nos)
    - BSc. nursing revised INC syllabus
    - Programme outcome, specific outcome and course outcome
    - Criteria for examiners (Theory and practical)
    - Mode of admission for BSc. nursing programme
    - Internal assessment marks distribution
    - Integration of MLHP
    - Module on Yoga for Nursing Students
    - Health awareness day calendar

BABA GHULAM SHAH BADSHAH UNIVERSITY

School of Nursing and Biomedical Sciences

SYLLABUS AND REGULATIONS FOR B.SC. NURSING

COLLEGE OF NURSING

RAJOURI, J&K-185234

COVER PAGE DESIGN AND EDITING: S MANIKANDAN, ASST PROFESSOR. CONR, BGSB UNIVERSITY.

INDEX

I. PHILOSOPHY

Baba Ghulam Shah Badshah University College of Nursing, Rajouri believes that:

Health and wellness are two fundamental concepts that are integrated throughout the program. Health is a state of well- being that encompasses physical, psychological, social, economic and spiritual dimensions. Wellness is the individual 's perception of wellness and is influenced by the presence of disease and individual 's ability to adapt. Health is a right of all people. Individuals have a right to be active participants in achieving health as they perceive it. Society consists of dynamic and interactive systems involving individuals, families, groups and communities. Cultural diversity, race, caste, creed, socio economic levels, religion, lifestyles, changes in environment and political factors influence it. Nurses and midwives recognize and respect human differences and diversity of population within society and provide ethical care with respect and dignity and protect their rights.

Nursing as a profession and a discipline utilizes knowledge derived from arts, sciences (physical, biological and behavioral), humanities and human experience. Nursing science incorporates clinical competence, critical thinking, communication, teaching learning, professionalism, and caring and cultural competency. Nurses collaborate with other health disciplines to solve individual and community health problems. Nursing facilitates evidence-based practice, compassionate caring among its practitioners in response to emerging issues in healthcare and new discoveries and technologies in profession. Nursing practice requires personal commitment to professional development and life-long learning.

Scope of nursing and midwifery practice encompasses provision of promotive, preventive, curative and rehabilitative aspects of care to people across the life span in a wide variety of healthcare settings. Nursing practice is based on acquisition of knowledge, understanding, attitude, competencies and skills through the Council's curricular and practice standards. The competencies in which the students are trained will guide them in performing their scope of practice. Nursing offers qualified nurses and midwives a wealth of opportunities in the field of practice, education, management and research in India and overseas.

The undergraduate nursing program is broad based education within an academic curricular framework specifically directed to the development of critical thinking skills, competencies appropriate to human and professional values. Blended learning approach comprising of experiential learning, reflective learning, scenario based learning and simulated learning is also inbuilt. The teaching learning process encourages mastery learning, modular, self-directed and self-accountable in choice making in terms of elective courses. The program

prepares its graduates to become exemplary citizens by adhering to code of ethics and professional conduct at all times in fulfilling personal, social and professional obligations so as to respond to national aspirations. Health and community orientation are provided with special emphasis on national health problems, national health programs and national health policy directives to achieve universal health

care for all citizens of India. The main roles of graduates would be provider of care with beginning proficiency in delivering safe care, coordinator/manager of care by being active participant of inter-professional team and member of a profession demonstrating self-responsibility and accountability for practice as well as to support the profession.

The faculty has the responsibility to be role models and create learning environment that facilitates cultivation of critical thinking, curiosity, creativity and inquiry driven self- directed learning and attitude of life-long learning in students. Learners and educators interact in a process whereby students gain competencies required to function within their scope of practice.

II. PROGRAMME OUTCOMES

On the completion of the B.Sc. Nursing program (8-semester) the nursing graduate will be able to:

PO1. Integrate comprehension of nursing standards of excellence within the context of nursing skills and practice.

PO2. Recognize the need for the advancement of professional practice through contributions to education, administration, health care policy, and knowledge development.

PO3. Demonstrate caring, culturally responsive leadership communication

PO4. Effectively lead interdisciplinary healthcare teams by applying knowledge of professional nursing leadership roles in the healthcare system.

PO5. Demonstrate effective communication using principles of disciplined writing.

PO6. Demonstrate cognizant knowledge of inter-professional healthcare leadership roles for quality healthcare outcomes.

PO7. Demonstrate nursing leadership to facilitate interpersonal collaborations, conflict resolution, and team-building in health care systems

PO8. Advocate policy decisions to improve healthcare that is effective, timely, efficient, and equitable for all members of society.

PO9. Demonstrate an understanding of competent ethical principles and values of nursing practice.

PO10. Work with dedication towards advancing a culture of professional excellence and achievement through lifelong learning.

III. AIMS

The aims of the undergraduate program are to:

1. Produce knowledgeable competent nurses and midwives with clear critical thinking skills who are caring, motivated, assertive and well-disciplined responding to the changing needs of profession, healthcare delivery system and society.
2. Prepare them to assume responsibilities as professional, competent nurses and midwives in providing promotive, preventive, curative and rehabilitative healthcare services in any healthcare setting.
3. Prepare nurses and midwives who can make independent decisions in nursing situations within the scope of practice, protect the rights of individuals and groups and conduct research in the areas of nursing practice and apply evidence- based practice.
4. Prepare them to assume role of practitioner, teacher, supervisor and manager in all healthcare settings.

IV. PROGRAMME SPECIFIC OUTCOMES:

On completion of the B.Sc. Nursing program, the B.Sc. nursing graduates will be able to;

PSO1: Utilize critical thinking to synthesize knowledge derived from physical, biological, behavioral sciences, and humanities, in the practice of professional nursing and midwifery.

PSO2: Practice professional nursing and midwifery competently and safely in diverse settings, utilizing caring, critical thinking and therapeutic nursing interventions with individuals, families, populations and communities at any developmental stage and with varied lived health experiences.

PSO3: Provide promotive, preventive and restorative health services in line with national health policies and programs.

PSO4: Integrate professional caring into practice decisions that encompass values, ethical, and moral and legal aspects of nursing.

PSO5: Respect the dignity, worth, and uniqueness of self and others.

PSO6: Apply concepts of leadership, autonomy and management to the practice of nursing and midwifery to enhance quality and safety in health care.

PSO7: Utilize the latest knowledge and skills related to information and technology to enhance patient outcomes.

PSO8: Communicate effectively with patients, peers, and all health care providers.

PSO9: Utilize the requisite knowledge, skills and technologies to practice independently and

collaboratively with all health professionals applying the principles of safety and quality improvement.

PSO10: Integrate research findings and nursing theory in decision making in evidence-based practice.

PSO11: Accept responsibility and accountability for the effectiveness of one‘s own nursing and midwifery practice and professional growth as a learner, clinician and leader.

PSO12: Participate in the advancement of the profession to improve health care for the betterment of the global society.

ADMISSION TERMS AND CONDITIONS

1. The minimum age for admission shall be 17 years on 31st December of the year in which admission is sought. The maximum age limit for admission shall be 35 years.

2. Minimum Educational Qualification

   a) Candidate with Science who have passed the qualifying 12th Standard examination (10+2) and must have obtained a minimum of 45% marks in Physics, Chemistry and Biology taken together and passed in English individually.

   b) Candidates are also eligible from State Open School recognized by State Government and National Institute of Open School (NIOS) recognized by Central Government having Science subjects and English only.

   c) English is a compulsory subject in 10+2 for being eligible for admission to B.Sc. (Nursing).

3. Colour blind candidates are eligible provided that Colour corrective contact lens and spectacles are worn by such candidates.

4. Candidate shall be medically fit.

5. Married candidates are also eligible for admission.

6. Students shall be admitted once in a year.

7. Selection of candidates should be based on the merit of the entrance examination. Entrance test** shall comprise of:

a)	**Aptitude for Nursing**	**20 marks**
b)	**Physics**	**20 marks**
c)	**Chemistry**	**20 marks**
d)	**Biology**	**20 marks**
e)	**English**	**20 marks**

MINIMUM QUALIFYING CRITERIA OF ENRANCE TEST FOR ADMISSION TO BSC (N)		
A.	**GENERAL**	**50TH PERCENTILE**
B.	**SC/ST/OBC**	**40TH PERCENTILE**
C.	**GENRAL -PWD**	**45TH PERCENTILE**
D.	**SC/ST/OBC-PWD**	**40TH PERCENTILE**

**Entrance test shall be conducted by University/State Government.

. Reservation Policy

• **Reservation of seats in for admission in Nursing Colleges for SC/ST/OBC/EWSs/PH**

Admission under the reserved quota shall be subject to reservation policy and eligibility criteria for SC/ST/OBC/EWSs prescribed by the Central Govt./State Govt./Union Territory as applicable to the College concerned.

In respect of candidates belonging to SC/ST/OBC the marks obtained in 3 subjects Physics, Chemistry, Biology shall be 40% and passed in English individually.

• **Reservation for disability**

5% Disability reservation to be considered for disabled candidates with a **disability of loco-motor** to the tune of 40% to 50% of the lower extremity and other eligibility criteria with regard to qualification will be same as prescribed for General category candidates. The upper age limit shall be relaxed by 5 years for disabled candidates.

Note: *A committee to be formed consisting of medical officer authorized by medical board of State government and a nursing expert in the panel which may decide whether the candidates have the disability of loco-motor to the tune of 40% to 50%.*

Note:

i. Reservations shall be applicable within the sanctioned number of the seats.

ii. The start of the semester shall be 1st August every year.

iii. No admission after the cut-off date i.e. 30th September will be undertaken. Further Hall Tickets/Admit Card shall not be issued to the candidates who are admitted after 30th September.

iv. The responsibility of obtaining and verifying the requisite documents for admission lies with the Institution and University.

9. Foreign Nationals:

The entry qualification equivalency i.e., 12th standard will be obtained by Association of Indian Universities, New

Delhi. Institution, SNRC and University will be responsible to ensure that the qualification and eligibility will be

equivalent to what has been prescribed by the Council.

10. Admission/Selection Committee

This committee should comprise of:

- Principal (Chairperson)
- Vice-Principal
- Professor
- Chief Nursing Officer or Nursing Superintendent

11. Admission Strength

Maximum intake of students shall be sixty if the institution has a 100 bedded unitary parent hospital and 61-100 if the

institution has 300 or more bedded unitary parent hospital.

12. Health Services

There should be provisions for the following health services for the students.

CURRICULUM

CURRICULAR FRAMEWORK

The B.Sc. Nursing program is a four-year program comprising of eight semesters that is credit and semester based. It is choice based only for elective courses. Competency based curriculum is the main approach that is based on ten core competencies. The courses are categorized into foundational courses, core courses and elective courses. The curricular framework shown in Figure 2 depicts the entire course of curriculum, which is further outlined in the program structure.

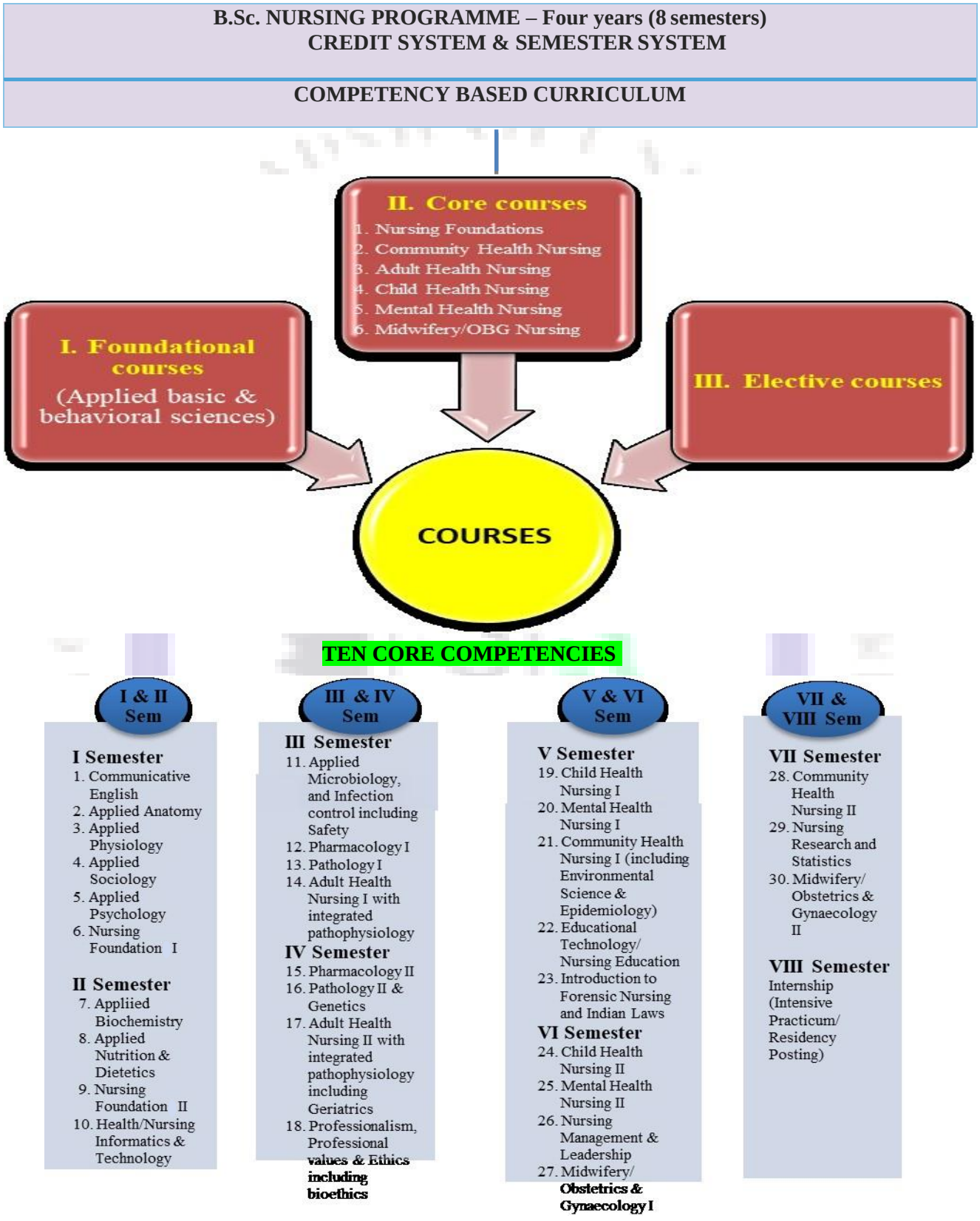

FIGURE 01: CURRICULAR FRAMEWORK

1. PROGRAM STRUCTURE

B.Sc. Nursing Program Structure			
I Semester 1. Communicative English 2. Applied Anatomy 3. Applied Physiology 4. Applied Sociology 5. Applied Psychology 6. *Nursing Foundation I ***Mandatory Module*** *First Aid as part of Nursing Foundation I Course	**III Semester** 1. Applied Microbiology and Infection Control including Safety 2. Pharmacology I 3. Pathology I 4. *Adult Health (Medical Surgical) Nursing I with integrated pathophysiology ***Mandatory Module*** *BCLS as part of Adult Health Nursing I	**V Semester** 1. *Child Health Nursing I 2. Mental Health Nursing I 3. Community Health Nursing I (including Environmental Science & Epidemiology) 4. Educational Technology/Nursing Education 5. Introduction to Forensic Nursing and Indian Laws ***Mandatory Modules*** *Essential Newborn Care (ENBC), Facility Based Newborn Care (FBNBC), IMNCI and PLS as part of Child Health Nursing	**VII Semester** 1. Community Health Nursing II 2. Nursing Research & Statistics 3. Midwifery/Obstetrics and Gynecology (OBG) Nursing II ***Mandatory Modules*** *Safe delivery app under OBG Nursing I/II (VI/VII Semester)

II Semester	**IV Semester**	**VI Semester**	**VIII Semester**
1. Applied Biochemistry 2. Applied Nutrition and Dietetics 3. *Nursing Foundation II 4. Health/Nursing Informatics & Technology ***Mandatory Module*** *Health Assessment as of Nursing Foundation II Course	1. *Pharmacology II 2. Pathology II & Genetics 3. Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing 4. Professionalism, Professional Values & Ethics including Bioethics ***Mandatory Module*** *Fundamentals of Prescribing under Pharmacology II *Palliative care module under Adult Health Nursing II	1. Child Health Nursing II 2. Mental Health Nursing II 3. Nursing Management & Leadership 4. *Midwifery/Obstetrics and Gynecology (OBG) Nursing I ***Mandatory Module*** * SBA Module under OBG Nursing I/II (VI/VII Semester)	Internship (Intensive Practicum/Residency Posting)

Note: No institute/University will modify the curriculum. However, they can add units/subject in the syllabus as deemed necessary.

#**Modules both mandatory and elective shall be certified by the institution/external agency**

MANDATORY MODULES

The prepared modules/modules outlined by the Council such as Health Assessment & Fundamentals of Prescribing and available modules as National Guidelines (First Aid – NDMA, IMNCI, ENBC, FBNBC), Palliative Care, Safe Delivery App and SBA module will be provided in separate learning resource package.

For BCLS, PLS – Standard national/international modules can be used. The mandatory modules are offered during the time allotted for respective courses in the course content as theory and practicum-Lab/Clinical.

ELECTIVE MODULES

Number of electives to be completed: 3 (Every module = 1 credit = 20 hours)

III & IV Semesters: To complete any **one** elective by end of 4^{th} semester across 1^{st} to 4^{th} semesters

- Human values
- Diabetes care
- Soft skills

V & VI Semesters: To complete any **one** of the following before end of 6^{th} semester

- CBT
- Personality development
- Addiction psychiatry
- Adolescent health
- Sports health
- Accreditation and practice standards
- Developmental psychology
- Menopausal health
- Health Economics

VII & VIII Semesters: To complete any **one** of the following before end of 8^{th} semester

- Scientific writing skills
- Lactation management
- Sexuality & Health
- Stress management
- Job readiness and employability in health care setting

2. CURRICULUM IMPLEMENTATION OVERALLL PLAN

Duration

Duration of the course shall be 8 semesters

Vacation

3 weeks

1-7 Semesters

[One Semester Plan for the first 7 Semesters]

a. Total Weeks per Semester: 26 weeks per semester

b. Number of Weeks per Semester for instruction: 20 weeks (40 hours per week × 20 weeks = 800 hours)
Number of Working Days: Minimum of 100 working days (5 days per week × 20 weeks)

c. Vacation, Holidays, Examination and Preparatory Holidays: 6 weeks

Holidays:

1 week

Examination and Preparatory Holidays:

2 weeks

8th Semester

a. One semester: 22 weeks

b. Vacation: 1week

c. Holidays: 1week

d. Examination and Preparatory Holidays = 2 weeks

3. COURSES OF INSTRUCTION WITH CREDIT STRUCTURE

S. No	Semester	Course Code	Course/Subject Title	Theory credits	Theory Contact hours	Lab / Skill Lab credits	Lab/ Skill Lab Contact hours	Clinical credits	Clinical Contact hours	Total credits	Total (hours)
1	**First**	ENGL 101	Communicative English	2	40						40
		ANAT 105	Applied Anatomy	3	60						60
		PHYS 110	Applied Physiology	3	60						60
		SOCI 115	Applied Sociology	3	60						60
		PSYC 120	Applied Psychology	3	60						60
		N-NF (I) 125	Nursing Foundation I including First Aid module	6	120	2	80	2	160	10	360
		SSCC (I) 130	Self-study/Co-curricular								40+40
			TOTAL	**20**	**400**	**2**	**80**	**2**	**160**	**20+2+2= 24**	**640+80**
2	**Second**	BIOC 135	Applied Biochemistry	2	40				40		
		NUTR 140	Applied Nutrition and Dietetics	3	60				60		
		N-NF (II) 125	Nursing Foundation II including Health Assessment module	6	120	3	120	4	320		560
		HNIT 145	Health/Nursing Informatics & Technology	2	40	1	40		80		
		SSCC(II) 130	Self-study/Co-curricular						40+20		
			TOTAL	**13**	**260**	**4**	**160**	**4**	**320**	**13+4+4=21**	**740+60**
3	**Third**	MICR 201	Applied Microbiology and Infection Control including Safety	2	40	1	40		80		
		PHAR (I) 205	Pharmacology I	1	20				20		
		PATH (I) 210	Pathology I	1	20				20		

		N-AHN(I)215	Adult Health Nursing I with integrated pathophysiology including BCLS module	7	140	1	40	6	480		660
		SSCC (I) 220	Self-study/Co-curricular						20		
			TOTAL	**11**	**220**	**2**	**80**	**6**	**480**	**11+2+6=19**	**780+20=800**
4	**Fourth**	PHAR (II) 205	Pharmacology II including Fundamentals of prescribing module	3	60				60		
		PATH (II) 210	Pathology II and Genetics	1	20				20		
		N-AHN (II) 225	Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing + Palliative care module	7	140	1	40	6	480		660
		PROF 230	Professionalism, Professional Values and Ethics including bioethics	1	20						20
		SSCC(II) 220	Self-study/Co-curricular								40
			TOTAL	**12**	**240**	**1**	**40**	**6**	**480**	**12+1+6=19**	**760+40**
5	**Fifth**	N-CHN(I) 301	Child Health Nursing I including Essential Newborn Care (ENBC), FBNC, IMNCI and PLS, modules	3	60	1	40	2	160		260
		N-MHN(I) 305	Mental Health Nursing I	3	60			1	80		140
		N-COMH(I) 310	Community Health Nursing I including Environmental Science & Epidemiology	5	100			2	160		260
		EDUC 315	Educational Technology/ Nursing Education	2	40	1	40	80			
		N-FORN 320	Introduction to Forensic Nursing and Indian laws	1	20		20				

		SSCC(I) 325	Self-study/Co-curricular		20+20						
			TOTAL	**14**	**280**	**2**	**80**	**5**	**400**	**14+2+ 5=21**	**760+40**
6	**Sixth**	N-CHN(II) 301	Child Health Nursing II	2	40	1	80				
		N-MHN(II) 305	Mental Health Nursing II	2	40	2	160				
		NMLE 330	Nursing Management & Leadership	3	60	1	80				
		N-MIDW(I) / OBGN 335	Midwifery/Obstetrics and Gynecology (OBG) Nursing I including SBA module	3	60	1	40	3	240		340
		SSCC(II) 325	Self-study/Co-curricular								
			TOTAL	**10**	**200**	**1**	**40**	**7**	**560**	**10+1+ 7=18**	**800**
7	**Seventh**	N-COMH(II) 401	Community Health Nursing II	5	100	2	160		260		
		NRST 405	Nursing Research & Statistics	2	40	2	80 (Project-40)	120			
		N-MIDW(II) / OBGN 410	Midwifery/Obstetrics and Gynecology (OBG) Nursing II including Safe delivery app module	3	60	1	40	4	320		420
			Self-study/Co-curricular	-------							
			TOTAL	10	200	3	120	6	480	**10+3+ 6=19**	**800**
8	**Eight (Internship)**	INTE 415	Community Health Nursing – 4 weeks								
		INTE 420	Adult Health Nursing – 6 weeks								
		INTE425	Child Health Nursing – 4 weeks								
		INTE 430	Mental Health Nursing – 4 weeks								

		INTE 435	Midwifery – 4 weeks								
			TOTAL = 22 weeks	**12** (1 credit= 4hours per week per semester)							1056 {4hours ×22weeks = 88 hours ×12credits =1056hours} (48hoursperweek× 22weeks)

- 1 credit theory – 1 hour per week per semester
- 1 credit practical/lab/skill lab/simulation lab – 2 hours per week per semester
- 1 credit clinical – 4 hours per week per semester
- 1 credit elective course – 1 hour per week per semester(Electives can be offered during delf-study hours as shown in the following tables)
- Total Semesters = 8
- (**Seven semesters:** One semester = 20 weeks × 40 hours per week = 800 hours)
- (**Eighth semester – Internship:** One semester = 22 weeks × 48 hours per week = 1056 hours)
- Total number of course credits including internship and electives – 156 (141+12+3)

Distribution of credits and hours by courses, internship and electives

S.No.	Credits	Theory (Cr/Hrs)	Lab (Cr/Hrs)	Clinical (Cr/Hrs)	Total credits	Hours
1	Course credits	90 credit per 1800 hours	15/600	36/2880	141	5280
2	Internship				12	1056
3	Electives				3	60
	TOTAL				156	6396
4	Self-study and Co-curricular	Saturdays (one semester = 5 hours per week × 20 weeks × 7 semesters = 700 hours)			12 35	240 700

Distribution of credits, hours and percentage for theory and practicum (Skill Lab & Clinical) across eight semesters

S.No.	Theory & Practicum (Skill Lab & Clinical)	Credits	Hours	Percentage
1	Theory	90	1800	28
2	Lab/Skill Lab	15	600	10
3	Clinical	36	3936	62
	Total	**141**	**6336 hours**	**100**

Practicum (7 semesters) excluding internship

Lab/skill lab/simulation lab – 600 (17%)

Clinical – 2880 (83%)

Total – 3480

Lab/skill lab/simulation lab = 17% of the total practicum planned

Note: Besides the stipulated lab and clinical hours, a maximum of 13% (400-450 hours) from the clinical hours can be used in simulation lab/skill lab for skill lab/simulation learning and not to exceed 30% of total hours.

4. SCHEME OF EXAMINATION

I SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for First Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal Assessment	End Semester College Exam	End Semester University Exam	Hours	Total Marks
	Theory					
01	Communicative English	25	25		2	50
02	Applied Anatomy & Applied Physiology	25		75	3	100
03	Applied Sociology & Applied Psychology	25		75	3	100
04	Nursing Foundation I	25**				
	Practical					
05	Nursing Foundation I*	25**				

*** Practical**

**** Nursing Foundation I Theory and practical Internal marks in Ist semester will be added to Nursing Foundation II Theory and practical Internal in the IInd semester and average of the two semesters will be taken. (Total weightage remains the same).**

Note: All practical examinations must be held in the respective clinical areas. One internal and one external examiner should jointly conduct the practical/clinical examination for each student.

II SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Second Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal Assessment	End Semester College Exam	End Semester University Exam	Hours	Total Marks
	Theory					
01	Applied Biochemistry and Applied Nutrition & Dietetics	25		75	3	100
02	Nursing Foundation (I & II)	25 I Sem-25 & II Sem-25 (with average of both)		75	3	100
03	Health/Nursing Informatics & Technology	25	25		2	50
	Practical					
04	Nursing Foundation (I & II)*	50 I Sem-25 & II Sem-25		50		100

*** Practical**

III SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Third Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Applied Microbiology and Infection Control including Safety	25		75	3	100
02	Pharmacology I and Pathology I	25**				
03	Adult Health Nursing I	25		75	3	100
	Practical					
04	Adult Health Nursing I*	50		50		100

***Practical**

****Will be added to the internal marks of Pharmacology II and Pathology II & Genetics in the next semester (Total weightage remains the same).**

IV SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fourth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Pharmacology & Pathology (I & II) and Genetics	25 III Sem-25 & IV Sem-25 (with average of both)		75	3	100
02	Adult Health Nursing II	25		75	3	100
03	Professionalism, Ethics and Professional Values	25	25		2	50
	Practical					
04	Adult Health Nursing II*	50		50		100

***Practical**

V SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Child Health Nursing I	25**				
02	Mental Health Nursing I	25**				
03	Community Health Nursing I including Environmental Science & Epidemiology	25		75	3	100
04	Educational Technology/Nursing Education	25		75	3	100
05	Introduction to Forensic Nursing and Indian Laws	25	25		2	50
	Practical					
06	Child Health Nursing I*	25**				
07	Mental Health Nursing I*	25**				
08	Community Health Nursing I*	50		50		100

***Practical**

****Will be added to the internal marks of Child Health Nursing II and Mental Health Nursing II in both theory and practical respectively in the next semester (Total weightage remains same).**

VI SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Sixth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Child Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average of both)		75	3	100
02	Mental Health Nursing (I & II)	25 Sem V-25 & Sem VI-25 (with average of both)		75	3	100
03	Nursing Management & Leadership	25		75	3	100
04	Midwifery/Obstetrics & Gynecology I	25**				
	Practical					
05	Child Health Nursing (I & II)*	50 (Sem V-25 & Sem VI-25)		50		100
06	Mental Health Nursing (I & II)*	50 (Sem V-25 & Sem VI-25)		50		100
07	Midwifery/Obstetrics & Gynecology I*	25**				

***Practical**

****Will be added to Internal marks of Midwifery II theory and practical respectively in the next semester (Total weightage remains the same**

VII SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total marks
	Theory					
01	Community Health Nursing II	25		75	3	100
02	Nursing Research & Statistics	25		75	3	100
03	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)	25 Sem VI-25 & Sem VII-25 (with average of both)		75	3	100
	Practical					
04	Community Health Nursing II*	50		50		100
05	Midwifery/Obstetrics and Gynecology (OBG) Nursing (I & II)*	50 (Sem VI-25 & Sem VII-25)		50		100

***Practical**

VIII SEMESTER

Distribution of Subjects and Marks for Internal Assessment and University Examination for Fifth Semester B. Sc Nursing

Sl no:	Course	Assessment (Marks)				
		Internal	End Semester College Exam	End Semester University Exam	Hours	Total marks
	Practical					
	Competency Assessment	100		100		200

5. EXAMINATION REGULATIONS

[Note:]

1. Applied Anatomy and Applied Physiology: Question paper will consist of Section-A Applied Anatomy of 37 marks and Section-B Applied Physiology of 38 marks.
2. Applied Sociology and Applied Psychology: Question paper will consist of Section-A Applied Sociology of 37 marks and Section-B Applied Psychology of 38 marks.
3. Applied Microbiology and Infection Control including Safety: Question paper will consist of Section-A Applied Microbiology of 37 marks and Section-B Infection Control including Safety of 38 marks.
4. Applied Biochemistry and Applied Nutrition and Dietetics: Question paper will consist of Section-A Applied Biochemistry with 25 marks and Section-B Applied Nutrition and Dietetics with 50 marks.
5. Pharmacology, Genetics and Pathology: Question paper will consist of Section-A of Pharmacology with 38 marks, Section-B of Pathology with 25 marks and Genetics with 12 marks.
6. Nursing Research and Statistics: Nursing Research should be of 55 marks and Statistics of 20 marks.
7. A candidate must have minimum of 80% attendance (irrespective of the kind of absence) in theory and practical in each course/subject for appearing for examination.
8. A candidate must have 100% attendance in each of the practical areas before award of degree.
9. Following exams shall be conducted as College exams. The minimum pass is 50% except for communicative English. The marks for all the college exams listed below alongside all other university exams must be sent to university for inclusion in the mark sheet and shall be considered for calculating aggregate and ranking for awards by university
    i. Communicative English
    ii. Health/Nursing Informatics and Technology
    iii. Professionalism, Professional Values and Ethics including Bioethics
    iv. Introduction to Forensic Nursing & Indian Laws

    [Award of rank will not be considered for those who fail in one or more courses and must have completed the program by 4 years. The mark sheet with grades and grade point average shall be given by the University for all courses].

    [Communicative English and Elective Modules are not included for calculating Semester Grade Point Average (SGPA)].
10. Minimum pass mark shall be 40% for Communicative English and in each of the Elective module. All Electives modules must be completed as indicated in specified semester and pass

marks sent to university before appearing for final examination.

11. Minimum pass marks shall be 50% in each of the Theory and practical papers separately except in English.

12. The student has to pass in all mandatory modules placed within courses and the pass mark for each module is 50%

13. A candidate has to pass in theory and practical exam separately in each of the paper.

14. If a candidate fails in either theory or practical, he/she has to re-appear for both the papers (Theory and Practical).

15. If the student has failed in only one subject and has passed in all the other subjects of a particular semester and Grace marks of up to 5 marks to theory marks can be added for one course/subject only, provided that by such an addition the student passes the semester examination.

16. The candidate shall appear for exams in each semester:

    i. The candidate shall have cleared all the previous examinations before appearing for fifth semester examination. However, the candidates shall be permitted to attend the consecutive semesters.

    ii. The candidate shall have cleared all the previous examinations before appearing for seventh semester examination. However, the candidates shall be permitted to attend the consecutive semesters.

    iii. The candidate shall have cleared all the previous examination before appearing for final year examination.

    iv. The maximum period to complete the course successfully should not exceed 8 years.

17. The candidate has to pass separately in internal and external examination (shall be reflected in the marks sheet). No institution shall submit average internal marks of the students not more than 75% (i.e. if 40 students are admitted in a course the average score of the 40 students shall not exceed 75% of total internal marks).

18. At least 50% of the Non-nursing subjects like Applied Anatomy & Physiology, Applied Biochemistry, Applied Psychology & Sociology, Applied Microbiology, Pharmacology, Genetics, Nutrition & Dietetics, Communicative English and Health/Nursing Informatics & Technology should be taught by the Nursing teachers. Teachers who are involved in teaching non-nursing subjects can be the examiners for the program.

19. Maximum number of candidates for practical examination should not exceed 20 per day. Particular year and of same institution batch shall be examined by the same set of examiners.

20. All practical examinations must be held in the respective clinical areas.

21. One internal and one external examiner should jointly conduct practical examination for each

student.

22. An examiner for theory and practical/OSCE examination should be an Assistant Professor or above in a College of Nursing with M.Sc. (Nursing) in concerned subject and minimum 3 years of teaching experience. To be an examiner for Nursing Foundations course, the faculty having M.Sc. (Nursing) with any specialty shall be considered.

23. Examiner for Competency Assessment – VIII Semester: There must be a total of five examiners, one from each specialty i.e. External examiners – 2 and Internal examiners – 3. The internal examiners may be from the college faculty or from hospital with the required qualification and experience i.e. M.Sc. (Nursing) in respective specialty with minimum three years of teaching experience.

6. ASSESSMENT GUIDELINES

1. Grading of Performance

Based on the performance, each student shall be awarded a final grade at the end of the semester for each course.

Absolute grading is used by converting the marks to grade, based on predetermined class intervals. UGC 10-point grading system is used with pass grade modified.

Letter grade	Grade point	Percentage of marks
O (Outstanding)	10	100%
A+ (Excellent)	9	90-99.99%
A (Very Good)	8	80-89.99%
B+ (Good)	7	70-79.99%
B (Above Average)	6	60-69.99%
C (Average)	5	50-59.99%
P (Pass)	4	40-49.99%
F (Fail)	0	<50%
Ab(Absent)	0	0
*Pass for Communicative English and Electives – 40% and above. Grade point 4 (40-49.99%)		

For Nursing Courses and all other courses – Pass is at C Grade (5 grade point)

50% and above For English and electives – Pass is at P Grade (4 grade point)

40% and above

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

SPGA is the weighted average of the grade points obtained in all courses by the student during the semester (All courses excluding English and electives)

Ex. SGPA Computation

Course Number	Credit/s	Letter grade	Grade point	Credit point (Credit × grade)
1	3 (C1)	A	8 (G1)	3 × 8 = 24
2	4 (C2)	B+	7 (G2)	4 × 7 = 28
3	3 (C3)	B	6 (G3)	3 × 6 = 18

$$\mathbf{SGPA} = \frac{C1G1 + C2G2 + C3G3}{C1 + C2 + C3}$$

$$= \frac{70}{10} = 7 \text{ (rounded off to two decimal points)}$$

Computation of CGPA

CGPA is calculated with SGPA of all semesters to two decimal points and is indicated in final grade in mark card/transcript showing grades of all 8 semesters and their courses/subjects.

CGPA reflects the failed status in case of fail till the course/s are passed.

Semester I	**Semester 2**	**Semester 3**	**Semester 4**
Credit – Cr Cr: 20	Cr: 22	Cr: 25	Cr: 26
SGPA: 6.5	SGPA: 7.0	SGPA: 5.5	SGPA: 6.0
Cr × SGPA = 20 × 6.5			

$$\textbf{CGPA} = \frac{20 \times 6.5 + 22 \times 7 + 25 \times 5.5 + 26 \times 6}{93}$$

$$= \frac{577.5}{93} = 6.2$$

Transcript Format

Based on the above recommendation on letter grades, grade points, SPGA and CGPA, the transcript shall be issued for each semester with a consolidated transcript indicating the performance in all semesters.

Declaration of Pass

First Class with Distinction – CGPA of 7.5

and above First Class – CGPA of 6.00-7.49

Second Class – CGPA of 5.00-5.99

2. Internal Assessment and Guidelines

The marks distribution of internal assessment is shown in Appendix 1 and the specific guidelines in Appendix 2.

3. University Theory and Practical Examination Pattern

The theory question paper pattern and practical exam pattern are shown in Appendix 3.

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SYLLABUS

IST SEMESTER

B.Sc. NURSING

COMMUNICATIVE ENGLISH

PLACEMENT: I SEMESTER

TIME-THEORY: 2 Credits (40 hours)

COURSE CODE: ENGL 101

COURSE DESCRIPTION: The course is designed to enable students to enhance their ability to speak and write the language (and use English) required for effective communication in their professional work. Students will practice their skills in verbal and written English during clinical and classroom experience.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the significance of Communicative English for healthcare professionals.
2. Apply the concepts and principles of English Language use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, Spelling, pause and silence.
3. Demonstrate attentive listening in different hypothetical situations.
4. Converse effectively, appropriately and timely within the given context and the individual or team they are communicating with either face to face or by other means.
5. Apply LSRW (Listening, Speaking, Reading and Writing) Skill in combination to learn, teach, educate and share information, ideas and results

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	3 (T)	Identify the significance of communicative English	**Communication** • What is communication? • What are communication roles of listeners, speakers, readers and writers as healthcare professionals?	• Definitions with examples, illustrations and explanations • Identifying competencies/ communicative strategies in LSRW • Reading excerpts on the above and interpreting them through tasks	• Checking for understanding through tasks

II	5 (T)	Describe concepts and principles of Language (English) use in professional development such as pronunciation, vocabulary, grammar, paraphrasing, voice modulation, spelling, pause and silence	**Introduction to LSRGW** • L – Listening: Different types of listening • S – Speaking: Understanding Consonants, Vowels, Word and Sentence Stress, Intonation • R – Reading: Medical vocabulary, • Gr – Grammar: Understanding tenses, linkers • W – Writing simple sentences and short paragraphs – emphasis on correct grammar	• Exercises on listening to news, announcements, telephone conversations and instructions from others • Information on fundamentals of Speech – Consonant, Vowel, Stress and Intonation with tasks based on these through audio/video and texts • Reading a medical dictionary/ glossary of medical terms with matching exercises	• Thorough check your understanding 'exercises
III	5 (T)	Demonstrate attentive listening in different hypothetical situations	**Attentive Listening** • Focusing on listening in different situations – announcements, descriptions, narratives, instructions, discussions, demonstrations • Reproducing Verbatim • Listening to academic talks/ lectures • Listening to presentation	• Listening to announcements, news, documentaries with tasks based on listening • With multiple choice, Yes/No and fill in the blank activities	• Checking individually against correct answers • Listening for specific information • Listening for overall meaning and instructions • Listening to attitudes and opinions • Listening to audio, video and identify key points

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
IV	9 (T)	Converse effectively, appropriately and timely within the given context and the individual or team they are communicating with either face to face or other means	**Speaking – Effective Conversation** • Conversation situations – informal, formal and neutral • Factors influencing way of speaking – setting, topic, social relationship, attitude and language • Greetings, introductions, requesting, asking for and giving permission, speaking personally and casual conversations • Asking for information, giving instructions and directions • Agreeing and disagreeing, giving opinions • Describing people, places, events and things, narrating, reporting & reaching conclusions • Evaluating and comparing • Complaints and suggestions • Telephone conversations • Delivering presentations	• Different types of speaking activities related to the content • Guided with prompts and free discussions • Presentation techniques • Talking to peers and other adults. • Talking to patients and Patient attenders • Talking to other healthcare professionals • Classroom conversation • Scenario based learning tasks	• Individual and group/peer assessment through live speaking tests • Presentation of situation in emergency and routine • Handoff • Reporting in doctors/nurses' rounds • Case presentation • Face to face oral communication • Speaking individually (Nurse to nurse/patient/ doctor) and to others in the group • Telephonic talking

V	5 (T)	Read, interpret and comprehend content in text, flow sheet, framework, figures, tables, reports, anecdotes	• **Reading** • Reading strategies, reading notes and messages • Reading relevant articles and news items • Vocabulary for everyday activities, abbreviations and medical vocabulary • Understanding visuals, graphs, figures and notes on instructions Reading reports and interpreting them • Using idioms and phrases, spotting errors, vocabulary for presentations • Remedial Grammar	• Detailed tasks and exercises on reading for information, inference and evaluation • Vocabulary games and puzzles for medical lexis • Grammar activities	• Reading/ summarizing/ justifying answers orally • Patient document • Doctor ‘s prescription of care • Journal/news reading and interpretation Notes/Reports
VI	5 (T)	Enhance expressions through writing skills	**Writing Skills** • Writing patient history • Note taking • Summarizing • Anecdotal records • Letter writing • Diary/Journal writing • Report writing • Paper writing skills • Abstract writing	• Writing tasks with focus on task fulfilment, coherence and cohesion, appropriate vocabulary and correct grammar • Guided and free tasks • Different kinds of letter writing tasks	• Paper based assessment by the teacher/ trainer against set band descriptors • Presentation of situation • Documentation • Report writing • Paper writing skills • Verbatim reproducing • Letter writing • Resume/CV

VII	8 (T)	Apply LSRW Skill in combination to learn, teach, educate and share information, ideas and results	**LSRW Skills** • Critical thinking strategies for listening and reading • Oral reports, presentations • Writing instructions, letters and reports • Error analysis regarding LSRW	• Valuating different options/multiple answers and interpreting decisions through situational activities • Demonstration – individually and in groups • Group Discussion • Presentation • Role Play • Writing reports	• Consolidated assessment orally and through written tasks/exercises

APPLIED ANATOMY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: ANAT 105

COURSE DESCRIPTION: The course is designed to assists student to recall and further acquire the knowledge of the normal structure of human body, identify alteration in anatomical structure with emphasis on clinical application to practice nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe anatomical terms.
2. Explain the general and microscopic structure of each system of the body.
3. Identify relative positions of the major body organs as well as their general anatomic locations.
4. Explore the effect of alterations in structure.
5. Apply knowledge of anatomic structures to analyze clinical situations and therapeutic applications.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Define the terms relative to the anatomical position Describe the anatomical planes Define and describe the terms used to describe movements	**Introduction to anatomical terms and organization of the human body** • Introduction to anatomical terms relative to position – anterior, ventral, posterior dorsal, superior, inferior, median, lateral, proximal, distal, superficial, deep, prone, supine, palmar and plantar • Anatomical planes (axial/ transverse/ horizontal, sagittal/vertical plane and coronal/frontal/oblique plane) • Movements (flexion, extension, abduction, adduction, medial rotation, lateral rotation, inversion, eversion, supination, pronation, plantar flexion, dorsal flexion and circumduction	• Lecture cum Discussion • Use of models • Video demonstration • Use of microscopic slides • Lecture cum Discussion • Video/Slides	• Quiz • MCQ • Short answer

		Organization of human body and structure of cell, tissues membranes and glands Describe the types of cartilage Compare and contrast the features of skeletal, smooth and cardiac muscle	Cell structure, Cell division Tissue – definition, types, characteristics, classification, location Membrane, glands – classification and structure Identify major surface and bony landmarks in each body region, Organization of human body Hyaline, fibro cartilage, elastic cartilage Features of skeletal, smooth and cardiac muscle Application and implication in nursing	Anatomical Torso	
II	6 (T)	Describe the structure of respiratory system Identify the muscles of respiration and examine their contribution to the mechanism of breathing	**The Respiratory system** • Structure of the organs of respiration • Muscles of respiration • Application and implication in nursing	• Lecture cum Discussion • Models • Video/Slides	• Short answer • Objective type
III	6 (T)	Describe the structure of digestive system	**The Digestive system** • Structure of alimentary canal and accessory organs of digestion • Application and implications in nursing	• Lecture cum Discussion • Video/Slides • Anatomical Torso	• Short answer • Objective type

IV	6 (T)	Describe the structure of circulatory and lymphatic system.	**The Circulatory and Lymphatic system** • Structure of blood components, blood vessels – Arterial and Venous system • Position of heart relative to the associated structures • Chambers of heart, layers of heart • Heart valves, coronary arteries • Nerve and blood supply to heart • Lymphatic tissue • Veins used for IV injections • Application and implication in nursing	• Lecture • Models • Video/Slides	• Short answer • MCQ
V	4 (T)	Identify the major endocrine glands and describe the structure of endocrine Glands	**The Endocrine system** • Structure of Hypothalamus, Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands	• Lecture • Models/charts	• Short answer • Objective type
VI	4 (T)	Describe the structure of various sensory organs	**The Sensory organs** • Structure of skin, eye, ear, nose and tongue • Application and implications in nursing	• Lecture • Explain with Video/ models/charts	• Short answer • MCQ

VII	10 (T)	Describe anatomical positions and structure of bones and joints Identify major bones that make up the axial and appendicular skeleton Classify the joints Identify the application and implications in nursing Describe the structure of muscle Apply the knowledge in performing nursing procedures/skills	**The Musculoskeletal System** **The Skeletal system** • Anatomical positions • Bones – types, structure, growth and Ossification • Axial and appendicular skeleton • Joints – classification, major joints and structure • Application and implications in nursing **The Muscular system** • Types and structure of muscles • Muscle groups – muscles of the head, neck, thorax, abdomen, pelvis, upper limb and lower limbs • Principal muscles – deltoid, biceps, triceps, respiratory, abdominal, pelvic floor, pelvic floor muscles, gluteal muscles and vastus lateralis Major muscles involved in nursing procedures	• Review – discussion • Lecture • Discussions • Explain using charts, skeleton and loose bones and torso • Identifying muscles involved in nursing procedures in lab	• Short answer • Objective type
VIII	5 (T)	Describe the structure of renal system	**The Renal system** • Structure of kidney, ureters, bladder, urethra • Application and implication in nursing	• Lecture • Models/charts	• MCQ • Short answer
IX	5 (T)	Describe the structure of reproductive system	**The Reproductive system** • Structure of male reproductive organs • Structure of female reproductive organs • Structure of breast	• Lecture • Models/charts	• MCQ • Short answer

X	6 (T)	Describe the structure of nervous system including the distribution of the nerves, nerve plexuses Describe the ventricular system	**The Nervous system** • Review Structure of neurons • CNS, ANS and PNS (Central, autonomic and peripheral) • Structure of brain, spinal cord, cranial nerves, spinal nerves, peripheral nerves, functional areas of cerebral cortex • Ventricular system – formation, circulation, and drainage • Application and implication in nursing	• Lecture • Explain with models • Video slides	• MCQ • Short answer

Note: Few lab hours can be planned for visits, observation and handling

(less than 1 credit lab hours are not specified separately)

APPLIED PHYSIOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: PHYS 110

COURSE DESCRIPTION: The course is designed to assists student to acquire comprehensive knowledge of the normal functions of the organ systems of the human body to facilitate understanding of physiological basis of health, identify alteration in functions and provide the student with the necessary physiological knowledge to practice nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding of the normal functioning of various organ systems of the body.
2. Identify the relative contribution of each organ system towards maintenance of homeostasis.
3. Describe the effect of alterations in functions.
4. Apply knowledge of physiological basis to analyze clinical situations and therapeutic applications.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4 (T)	Describe the physiology of cell, tissues, membranes and glands	**General Physiology – Basic concepts** • Cell physiology including transportation across cell membrane • Body fluid compartments, Distribution of total body fluid, intracellular and extracellular compartments, major electrolytes and maintenance of homeostasis • Cell cycle • Tissue – formation, repair • Membranes and glands – functions • Application and implication in nursing	• Review – discussion • Lecture cum Discussion • Video demonstrations	• Quiz • MCQ • Short answer

II	6 (T)	Describe the physiology and mechanism of respiration Identify the muscles of respiration and examine their contribution to the mechanism of breathing	**Respiratory system** • Functions of respiratory organs • Physiology of respiration • Pulmonary circulation – functional features • Pulmonary ventilation, exchange of gases • Carriage of oxygen and carbon-dioxide, Exchange of gases in tissue • Regulation of respiration • Hypoxia, cyanosis, dyspnea, periodic breathing • Respiratory changes during exercise • Application and implication in nursing	• Lecture • Video slides	• Essay • Short answer • MCQ
III	8 (T)	Describe the functions of digestive system	**Digestive system** • Functions of the organs of digestive tract • Saliva – composition, regulation of secretion and functions of saliva • Composition and function of gastric juice, mechanism and regulation of gastric secretion • Composition of pancreatic juice, function, regulation of pancreatic secretion • Functions of liver, gall bladder and pancreas • Composition of bile and function • Secretion and function of small and large intestine • Movements of alimentary tract • Digestion in mouth, stomach, small intestine, large intestine, absorption of food	• Lecture cum Discussion • Video slides	

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
IV	6 (T)	Explain the functions of the heart, and physiology of circulation	**Circulatory and Lymphatic system** • Functions of heart, conduction system, • cardiac cycle, Stroke volume and cardiac output • Blood pressure and Pulse • Circulation – principles, factors influencing blood pressure, pulse • Coronary circulation, Pulmonary and systemic circulation • Heart rate – regulation of heart rate • Normal value and variations • Cardiovascular homeostasis in exercise and posture • Application and implication in nursing	• Lecture • Discussion • Video/Slides	• Short answer • MCQ
V	5 (T)	Describe the composition and functions of blood	**Blood** • Blood – Functions, Physical characteristics • Formation of blood cells • Erythropoiesis – Functions of RBC, RBC life cycle • WBC – types, functions • Platelets – Function and production of platelets • Clotting mechanism of blood, clotting time, bleeding time, PTT • Hemostasis – role of vasoconstriction, platelet plug formation in hemostasis, coagulation factors, intrinsic and extrinsic pathways of coagulation • Blood groups and types • Functions of reticuloendothelial system, immunity • Application in nursing	• Lecture • Discussion • Videos	• Essay • Short answer • MCQ

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
VI	5 (T)	Identify the major endocrine glands and describe their functions	**The Endocrine system** • Functions and hormones of Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands. • Other hormones • Alterations in disease • Application and implication in nursing	• Lecture • Explain using charts	• Short answer • MCQ
VII	4 (T)	Describe the structure of various sensory organs	**The Sensory Organs** • Functions of skin • Vision, hearing, taste and smell • Errors of refraction, aging changes	• Lecture • Video	• Short answer • MCQ
VIII	6 (T)	Describe the functions of bones, joints, various types of muscles, its special properties and nerves supplying them	**Musculoskeletal system** • Bones – Functions, movements of bones of axial and appendicular skeleton, Bone healing • Joints and joint movements • Alteration of joint disease • Properties and Functions of skeletal muscles – mechanism of muscle contraction • Structure and properties of cardiac muscles and smooth muscles Application and implication in nursing	• Lecture • Discussion • Video presentation	• Structured essay • Short answer • MCQ
IX	4 (T)	Describe the physiology of renal system	**Renal system** • Functions of kidney in maintaining homeostasis • GFR • Functions of ureters, bladder and urethra • Micturition • Regulation of renal function • Application and implication in nursing	• Lecture • Charts and models	• Short answer • MCQ

X	4 (T)	Describe the structure of reproductive system	**The Reproductive system** • Female reproductive system – Menstrual cycle, function and hormones of ovary, oogenesis, fertilization, implantation, Functions of breast • Male reproductive system – Spermatogenesis, hormones and its functions, semen • Application and implication in providing nursing care	• Lecture • Explain using charts, models, specimens	• Short answer • MCQ
XI	8 (T)	Describe the functions of brain, physiology of nerve stimulus, reflexes, cranial and spinal nerves	• **Nervous system** • Overview of nervous system • Review of types, structure and functions of neurons • Nerve impulse • Review functions of Brain- Medulla, Pons, Cerebrum, Cerebellum • Sensory and Motor Nervous system • Peripheral Nervous system • Autonomic Nervous system • Limbic system and higher mental Functions- Hippocampus, Thalamus, Hypothalamus • Vestibular apparatus • Functions of cranial nerves • Autonomic functions • Physiology of Pain- somatic, visceral and referred • Reflexes • CSF formation, composition, circulation of CSF, blood brain barrier and blood CSF barrier • Application and implication in nursing	• Lecture cum Discussion • Video slides	• Brief structured essays • Short answer • MCQ • Critical reflection

Note: Few lab hours can be planned for visits, observation and handling

(less than 1 credit lab hours are not specified separately.

APPLIED SOCIOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 hours)

COURSE CODE: SOCI 115

DESCRIPTION: This course is designed to enable the students to develop understanding about basic concepts of sociology and its application in personal and community life, health, illness and nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the scope and significance of sociology in nursing.
2. Apply the knowledge of social structure and different culture in a society in identifying social needs of sick clients.
3. Identify the impact of culture on health and illness.
4. Develop understanding about types of family, marriage and its legislation.
5. Identify different types of caste, class, social change and its influence on health and health practices.
6. Develop understanding about social organization and disorganization and social problems in India.
7. Integrate the knowledge of clinical sociology and its uses in crisis intervention.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	1 (T)	Describe the scope and significance of sociology in nursing	**Introduction** • Definition, nature and scope of sociology • Significance of sociology in nursing	• Lecture • Discussion	• Essay • Short answer
II	15 (T)	Describe the individualization, Groups, processes of Socialization, social change and its importance	**Social structure** • Basic concept of society, community, association and institution • Individual and society • Personal disorganization • Social group – meaning, characteristics, and classification. • Social processes – definition and forms, Co- operation, competition, conflict, accommodation, assimilation, isolation	• Lecture cum Discussion	• Essay • Short answer • Objective type

			• Socialization – characteristics, process, agencies of socialization • Social change – nature, process, and role of nurse • Structure and characteristics of urban, rural and tribal community. • Major health problems in urban, rural and tribal communities • Importance of social structure in nursing profession		
III	8 (T)	Describe culture and its impact on health and disease	**Culture** • Nature, characteristic and evolution of culture • Diversity and uniformity of culture • Difference between culture and civilization • Culture and socialization • Transcultural society • Culture, Modernization and its impact on health and disease	• Lecture • Panel discussion	• Essay • Short answer
IV	8 (T)	Explain family, marriage and legislation related to marriage	**Family and Marriage** • Family – characteristics, basic need, types and functions of family • Marriage – forms of marriage, social custom relating to marriage and importance of marriage • Legislation on Indian marriage and family. • Influence of marriage and family on health and health practices	• Lecture	• Essay • Short answer • Case study report
V	8 (T)	Explain different types of caste and classes in society and its influence on health	**Social stratification** • Introduction – Characteristics & forms of stratification • Function of stratification • Indian caste system – origin and characteristics • Positive and negative impact of caste in society. • Class system and status • Social mobility-meaning and types • Race – concept, criteria of racial classification • Influence of class, caste and race system on health.	• Lecture • Panel discussion	• Essay • Short answer • Objective type

VI	15 (T)	Explain social organization, disorganization, social problems and role of nurse in reducing social problems	**Social organization and disorganization** • Social organization – meaning, elements and types • Voluntary associations • Social system – definition, types, role and status as structural element of social system. • Interrelationship of institutions • Social control – meaning, aims and process of social control • Social norms, moral and values • Social disorganization – definition, causes, Control and planning • Major social problems – poverty, housing, food supplies, illiteracy, prostitution, dowry, Child labor, child abuse, delinquency, crime, substance abuse, HIV/AIDS, COVID-19 • Vulnerable group – elderly, handicapped, minority and other marginal groups. • Fundamental rights of individual, women and children • Role of nurse in reducing social problem and enhance coping • Social welfare programs in India	• Lecture • Group discussion • Observational visit	• Essay • Short answer • Objective type • Visit report
VII	5 (T)	Explain clinical sociology and its application in the hospital and community	**Clinical sociology** • Introduction to clinical sociology • Sociological strategies for developing services for the abused • Use of clinical sociology in crisis intervention	• Lecture, • Group discussion • Role play	• Essay • Short answer

APPLIED PSYCHOLOGY

PLACEMENT: I SEMESTER

TIME-THEORY: 3 Credits (60 Hours)

COURSE CODE: PSYC 120

DESCRIPTION: This course is designed to enable the students to develop understanding about basic concepts of psychology and its application in personal and community life, health, illness and nursing. It further provides students opportunity to recognize the significance and application of soft skills and self-empowerment in the practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the importance of psychology in individual and professional life.
2. Develop understanding of the biological and psychological basis of human behaviour.
3. Identify the role of nurse in promoting mental health and dealing with altered personality.
4. Perform the role of nurses applicable to the psychology of different age groups.
5. Identify the cognitive and affective needs of clients.
6. Integrate the principles of motivation and emotion in performing the role of nurse in caring for emotionally sick client.
7. Demonstrate basic understanding of psychological assessment and nurse‘s role.
8. Apply the knowledge of soft skills in workplace and society.
9. Apply the knowledge of self-empowerment in workplace, society and personal life.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Describe scope, branches and significance of psychology in nursing	**Introduction** • Meaning of Psychology • Development of psychology – Scope, branches and methods of psychology • Relationship with other subjects • Significance of psychology in nursing	• Lecture cum Discussion	• Essay • Short answer
II	4 (T)	Describe biology of human behaviour	**Biological basis of behavior – Introduction** • Body mind relationship • Genetics and behaviour • Inheritance of behaviour • Brain and behaviour. • Psychology and sensation – sensory process – normal and abnormal	• Lecture • Discussion	• Essay • Short answer

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III	5 (T)	Describe mentally healthy person and defense mechanisms	**Mental health and mental hygiene** • Concept of mental health and mental hygiene • Characteristic of mentally healthy person • Warning signs of poor mental health • Promotive and preventive mental health strategies and services • Defense mechanism and its implication • Frustration and conflict – types of conflicts and measurements to overcome • Role of nurse in reducing frustration and conflict and enhancing coping • Dealing with ego	• Lecture • Case discussion • Role play	• Essay • Short answer • Objective type
IV	7 (T)	Describe psychology of people in different age groups and role of nurse	**Developmental psychology** • Physical, psychosocial and cognitive development across life span – Prenatal through early childhood, middle to late childhood through adolescence, early and mid-adulthood, late adulthood, death and dying • Role of nurse in supporting normal growth and development across the life span • Psychological needs of various groups in health and sickness – Infancy, childhood, adolescence, adulthood and older adult • Introduction to child psychology and role of nurse in meeting the psychological needs of children • Psychology of vulnerable individuals – challenged, women, sick etc. • Role of nurse with vulnerable groups	• Lecture • Group • discussion	• Essay • Short answer

V	4 (T)	Explain personality and role of nurse in identification and improvement in altered personality	**Personality** • Meaning, definition of personality • Classification of personality • Measurement and evaluation of personality – Introduction • Alteration in personality • Role of nurse in identification of individual personality and improvement in altered personality	• Lecture • Discussion • Demonstration	• Essay and short answer • Objective type
VI	16 (T)	Explain cognitive process and their applications	**Cognitive process** • **Attention** – definition, types, determinants, duration, degree and alteration in attention • **Perception –** Meaning of Perception, principles, factor affecting perception, • **Intelligence** – Meaning of intelligence – Effect of heredity and environment in intelligence, classification, Introduction to measurement of intelligence tests – Mental deficiencies • **Learning –** Definition of learning, types of learning, Factors influencing learning – Learning process, Habit formation • **Memory**-meaning and nature of memory, factors influencing memory, methods to improve memory, forgetting • **Thinking** – types, level, reasoning and problem solving. • **Aptitude** – concept, types, individual differences and variability • Psychometric assessment of cognitive processes – Introduction • Alteration in cognitive processes	• Lecture • Discussion	• Essay and short answer • Objective type

VII	6 (T)	Describe motivation, emotion, attitude and role of nurse in emotionally sick client	**Motivation and emotional processes** • **Motivation** – meaning, concept, types, theories of motivation, motivation cycle, biological and special motives • **Emotions** – Meaning of emotions, development of emotions, alteration of emotion, emotions in sickness – handling emotions in self and other • Stress and adaptation – stress, stressor, cycle, effect, adaptation and coping • **Attitudes** – Meaning of attitudes, nature, factor affecting attitude, attitudinal change, Role of attitude in health and sickness • Psychometric assessment of emotions and attitude – Introduction • Role of nurse in caring for emotionally sick client	• Lecture • Group discussion	• Essay and short answer • Objective type
VIII	4 (T)	Explain psychological assessment and tests and role of nurse	**Psychological assessment and tests – introduction** • Types, development, characteristics, principles, uses, interpretation • Role of nurse in psychological assessment	• Lecture • Discussion • Demonstration	• Short answer • Assessment of practice
IX	10 (T)	Explain concept of soft skill and its application in work place and society	**Application of soft skill** • Concept of soft skill • Types of soft skill – visual, aural and communication skill • The way of communication • Building relationship with client and society • **Interpersonal Relationships (IPR):** Definition, Types, and Purposes, Interpersonal skills, Barriers, Strategies to overcome barriers • Survival strategies – managing time, coping stress, resilience, work – life balance • Applying soft skill to workplace and society	• Lecture • Group discussion • Role play • Refer/Complete Soft skills module	• Essay and short answer

			Presentation skills, social etiquette, telephone etiquette, motivational skills, teamwork etc. • Use of soft skill in nursing	•	•
X	2 (T)	Explain self-empowerment	**Self-empowerment** • Dimensions of self-empowerment • Self-empowerment development • Importance of women's empowerment in society • Professional etiquette and personal grooming • Role of nurse in empowering others	• Lecture • Discussion	• Short answer • Objective type

NURSING FOUNDATION - I (Including First Aid Module)

PLACEMENT: I SEMESTER

TIME-THEORY: 6 Credits (120 hours)

PRACTICUM: Skill Lab: 2 Credits (80 hours) and Clinical: 2 Credits (160 hours)

COURSE CODE: N-NF(I) 125

DESCRIPTION: This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding about the concept of health, illness and scope of nursing within health care services.
2. Apply values, code of ethics and professional conduct in professional life.
3. Apply the principles and methods of effective communication in establishing communication links with patients, families and other health team members.
4. Develop skill in recording and reporting.
5. Demonstrate competency in monitoring and documenting vital signs.
6. Describe the fundamental principles and techniques of infection control and biomedical waste management.
7. Identify and meet the comfort needs of the patients.
8. Perform admission, transfer, and discharge of a patient under supervision applying the knowledge.
9. Demonstrate understanding and application of knowledge in caring for patients with restricted mobility.
10. Perform first aid measures during emergencies.
11. Identify the educational needs of patients and demonstrate basic skills of patient education.

***Mandatory Module used in Teaching/Learning: First Aid: 40 Hours (including Basic CPR)**

COURSE OUTLINE

T – Theory, SL – Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Describe the concept of health and illness	**Introduction to health and illness** • Concept of Health – Definitions (WHO), Dimensions • Maslow's hierarchy of needs • Health – Illness continuum • Factors influencing health • Causes and risk factors for developing illnesses • Illness – Types, illness behavior • Impact of illness on patient and family	• Lecture • Discussion	• Essay • Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Describe the concept of health and illness	**Introduction to health and illness** • Concept of Health – Definitions (WHO), Dimensions • Maslow's hierarchy of needs • Health – Illness continuum • Factors influencing health • Causes and risk factors for developing illnesses • Illness – Types, illness behavior • Impact of illness on patient and family	• Lecture • Discussion	• Essay • Short answer • Objective type
II	5 (T)	Describe the levels of illness prevention and care, health care services	**Health Care Delivery Systems –** ***Introduction of Basic Concepts & Meanings*** • Levels of Illness Prevention – Primary (Health Promotion), Secondary and Tertiary • Levels of Care – Primary, Secondary and Tertiary • Types of health care agencies/ services – Hospitals, clinics, Hospice, rehabilitation centres, extended care facilities Hospitals – Types, Organization and Functions	• Lecture • Discussion	• Essay • Short answer • Objective type
III	12 (T)	Trace the history of Nursing Explain the concept, nature and scope of nursing Describe values, code of ethics and professional conduct for nurses in India	**History of Nursing and Nursing as a profession** • History of Nursing, History of Nursing in India • Contributions of Florence Nightingale • Nursing – Definition – Nurse, Nursing, Concepts, philosophy, objectives, Characteristics, nature and Scope of Nursing/ Nursing practice, Functions of nurse, Qualities of a nurse, Categories of nursing personnel • Nursing as a profession – definition and characteristics/criteria of profession • Values – Introduction – meaning and importance • Code of ethics and professional conduct for nurses – Introduction	• Lecture • Discussion • Case discussion • Role plays	• Essay • Short answers • Objective type

IV	8 (T) 3 (SL)	Describe the process, principles, and types of communication Explain therapeutic, non-therapeutic and professional communication Communicate effectively with patients, their families and team members	**Communication and Nurse Patient Relationship** • Communication – Levels, Elements and Process, Types, Modes, Factors influencing communication • Methods of effective communication/therapeutic communication techniques • Barriers to effective communication/non- therapeutic communication techniques • Professional communication • Helping Relationships (Nurse Patient Relationship) – Purposes and Phases • Communicating effectively with patient, families and team members • Maintaining effective human relations and communication with vulnerable groups (children, women, physically and mentally challenged and elderly)	• Lecture • Discussion • Role play and video film on Therapeutic Communication	• Essay • Short answer • Objective type
V	4 (T) 2 (SL)	Describe the purposes, types and techniques of recording and reporting Maintain records and reports accurately	**Documentation and Reporting** • Documentation – Purposes of Reports and Records • Confidentiality • Types of Client records/Common Record- keeping forms • Methods/Systems of documentation/Recording Guidelines for documentation • Do‘s and Don‘ts of documentation/Legal guidelines for Documentation/Recording • Reporting – Change of shift reports, Transfer reports, Incident reports	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

VI	15 (T) 20 (SL)	Describe principles and techniques of monitoring and maintaining vital signs Assess and record vital signs accurately	**Vital signs** • Guidelines for taking vital signs • *Body temperature* – ○ Definition, Physiology, Regulation, Factors affecting body temperature ○ Assessment of body temperature – sites, equipment and technique ○ Temperature alterations – Hyperthermia, Heat Cramps, Heat Exhaustion, Heatstroke, Hypothermia ○ Fever/Pyrexia – Definition, Causes, Stages, Types • Nursing Management ○ Hot and Cold applications • *Pulse*: ○ Definition, Physiology and Regulation, Characteristics, Factors affecting pulse ○ Assessment of pulse – sites, equipment and technique ○ Alterations in pulse • *Respiration:* ○ Definition, Physiology and Regulation, Mechanics of breathing, Characteristics, Factors affecting respiration ○ Assessment of respirations – technique ○ Arterial Oxygen saturation ○ Alterations in respiration • *Blood pressure*: ○ Definition, Physiology and Regulation, Characteristics, Factors affecting BP ○ Assessment of BP – sites, equipment and technique, Common Errors in BP Assessment ○ Alterations in Blood Pressure • Documenting Vital Signs	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • Document the given values of temperature, pulse, and respiration in the graphic sheet • OSCE
VII	3 (T)	Maintain equipment and linen	**Equipment and Linen** • Types – Disposables and reusable oLinen, rubber goods, glassware, metal, plastics, furniture • Introduction – Indent, maintenance, Inventory		

VIII	10 (T) 3 (SL)	Describe the basic principles and techniques of infection control and biomedical waste management	**Introduction to Infection Control in Clinical setting Infection** • Nature of infection • Chain of infection • Types of infection • Stages of infection • Factors increasing susceptibility to infection • Body defenses against infection – Inflammatory response & Immune response • Health care associated infection (Nosocomial infection) **Introductory concept of Asepsis – Medical & Surgical asepsis** ***Precautions*** • Hand Hygiene • (Hand washing and use of hand Rub) • Use of Personal Protective Equipment (PPE) • Standard precautions ***Biomedical Waste management*** • Types of hospital waste, waste segregation and hazards – Introduction	• Lecture • Discussion • Demonstration • Observation of autoclaving and other sterilization techniques • Video presentation on medical & surgical asepsis	• Essay • Short answer • Objective type
			Comfort, Rest & Sleep and Pain • Comfort ○ Factors Influencing Comfort ○ Types of beds including latest beds, purposes & bed making ○ Therapeutic positions ○ Comfort devices • Sleep and Rest ○ Physiology of sleep ○ Factors affecting sleep ○ Promoting Rest and sleep ○ Sleep Disorders	•	•

IX	15 (T) 15 (SL)	Identify and meet the comfort needs of the patients	• Pain (Discomfort) ○ Physiology ○ Common cause of pain ○ Types ○ Assessment – pain scales and narcotic scales • Pharmacological and Non-pharmacological pain-relieving measures – Use of narcotics, TENS devices, PCA • Invasive techniques of pain management • Any other newer measures ○ CAM (Complementary & Alternative healing Modalities	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • OSCE
X	5 (T) 3 (SL)	Describe the concept of patient environment	**Promoting Safety in Health Care Environment** • Physical environment – Temperature, Humidity, Noise, Ventilation, Light, Odor, Pest control • Reduction of Physical hazards – fire, accidents • Fall Risk Assessment • Role of nurse in providing safe and clean environment • Safety devices – ○ Restraints – Types, Purposes, Indications, Legal Implications and Consent, Application of Restraints- Skill and Practice guidelines ○ Other Safety Devices – Side rails, Grab bars, Ambu alarms, non-skid slippers etc.	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type
XI	6 (T) 2 (SL)	Explain and perform admission, transfer, and discharge of a patient	**Hospital Admission and discharge** • Admission to the hospital Unit and preparation of unit • Admission bed • Admission procedure • Medico-legal issues • Roles and Responsibilities of the nurse • Discharge from the hospital • Types – Planned discharge, LAMA and Abscond, Referrals and transfers • Discharge Planning oDischarge • procedure oMedico-legal issues • Roles and Responsibilities of the nurse • Care of the unit after discharge	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

XII	8 (T)
	10 (SL)
		Demonstrate skill in caring for patients with restricted mobility	**Mobility and Immobility**
			• Elements of Normal Movement, Alignment & Posture, Joint Mobility, Balance, Coordinated Movement
			• Principles of body mechanics
			• Factors affecting Body Alignment and activity
			• Exercise – Types and benefits
			• Effects of Immobility
			• Maintenance of normal Body Alignment and Activity
			• Alteration in Body Alignment and mobility
			• Nursing interventions for impaired Body Alignment and Mobility – assessment, types, devices used, method
			  • Range of motion exercises
			  • Muscle strengthening exercises
			  • Maintaining body alignment – positions
			  • Moving
			  • Lifting
			  • Transferring
			  • Walking
			• Assisting clients with ambulation
			• Care of patients with Immobility using Nursing process approach
			• Care of patients with casts and splints
				• Lecture
				• Discussion
				• Demonstration & Re-demonstration
					• Essay
					• Short answer Objective type
					• OSCE

XIII	4 (T) 2 (SL)	Describe the principles and practice of patient education	**Patient education** • Patient Teaching – Importance, Purposes, Process • Integrating nursing process in patient teaching	• Discussion • Role plays	• Essay • Short answer • Objective type

XIV	20 (T) 20 (SL)	Explain and apply principles of First Aid during emergencies	**First Aid*** • Definition, Basic Principles, Scope & Rules • First Aid Management o Wounds, Hemorrhage & Shock o Musculoskeletal Injuries – Fractures, Dislocation, Muscle injuries o Transportation of Injured persons o Respiratory Emergencies & Basic CPR o Unconsciousness o Foreign Bodies – Skin, Eye, Ear, Nose, Throat & Stomach o Burns & Scalds o Poisoning, Bites & Stings oFrostbite & Effects of Heat o Community Emergencies	• Lecture • Discussion • Demonstration & Re-demonstration • Module completion • National Disaster Management Authority (NDMA) / Indian Red Cross Society (IRCS) First Aid module	• Essay • Short answer • Objective type • OSCE

*Mandatory module

CLINICAL PRACTICUM

Clinical Practicum: 2 Credits (160 hours), 10 weeks × 16 hours per week

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will be able to

1. Maintain effective human relations (projecting professional image)
2. Communicate effectively with patient, families and team members
3. Demonstrate skills in techniques of recording and reporting
4. Demonstrate skill in monitoring vital signs
5. Care for patients with altered vital signs
6. Demonstrate skill in implementing standard precautions and use of PPE
7. Demonstrate skill in meeting the comfort needs of the patients
8. Provide safe and clean environment
9. Demonstrate skill in admission, transfer, and discharge of a patient
10. Demonstrate skill in caring for patients with restricted mobility
11. Plan and provide appropriate health teaching following the principles
12. Acquire skills in assessing and performing First Aid during emergencies.

SKILL LAB

Use of Mannequins and Simulators

S.No.	Competencies	Mode of Teaching
1.	Therapeutic Communication and Documentation	Role Play
2.	Vital signs	Simulator/Standardized patient
3.	Medical and Surgical Asepsis	Videos/Mannequin
4.	Pain Assessment	Standardized patient
5.	Comfort Devices	Mannequin
6.	Therapeutic Positions	Mannequin
7.	Physical Restraints and Side rails	Mannequin
8.	ROM Exercises	Standardized patient
9.	Ambulation	Standardized patient
10.	Moving and Turning patients in bed	Mannequin
11.	Changing position of helpless patients	Mannequin/Standardized patient
12.	Transferring patients' bed to stretcher/wheel chair	Mannequin/Standardized patient
13.	Admission, Transfer, Discharge & Health Teaching	Role Play

CLINICAL POSTINGS – General Medical/Surgical Wards
10 weeks × 16 hours/week = 160 Hours

Clinical Unit	Duration (in Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
General Medical/ Surgical wards	2	Maintain effective human relations (projecting professional image) Communicate effectively with patient, families and team members	**Communication and Nurse patient relationship** • Maintaining Communication with patient and family and interpersonal relationship • Documentation and Reporting ○ Documenting patient care and procedures ○ Verbal report ○ Written report		• OSCE
	2	Demonstrate skill in monitoring vital signs Care for patients with altered vital signs Demonstrate skill in implementing standard precautions and use of PPE	*Vital signs* • Monitor/measure and document vital signs in a graphic sheet ○ Temperature (oral, tympanic, axillary) ○ Pulse (Apical and peripheral pulses) ○ Respiration ○ Blood pressure ○ Pulse oximetry • Interpret and report alteration • Cold Applications – Cold Compress, Ice cap, Tepid Sponging • Care of equipment – thermometer, BP apparatus, Stethoscope, Pulse oximeter *Infection control in Clinical settings* • Hand hygiene • Use of PPE	• Care of patients with alterations in vital signs- 1	• Assessment of clinical skills using checklist • OSCE

	3	Demonstrate skill in meeting the comfort needs of the patients Provide safe and clean environment	**Comfort, Rest & Sleep, Pain and Promoting Safety in Health Care Environment** *Comfort, Rest & Sleep* • Bed making- ○ Open ○ Closed ○ Occupied ○ Post-operative ○ Cardiac bed ○ Fracture bed ○ Comfort devices ○ Pillows ○ Over bed table/cardiac table ○ Back rest ○ Bed Cradle ○ Therapeutic Positions ○ Supine ○ Fowlers (low, semi, high) ○ Lateral o Prone o Sim‘s ○ Trendelenburg ○ Dorsal recumbent ○ Lithotomy ○ Knee chest ○ Pain ○ Pain assessment and provision for comfort ○ Promoting Safety in Health Care Environment ○ Care of Patient ‘s Unit ○ Use of Safety devices: ○ Side Rails ○ Restraints (Physical) ○ Fall risk assessment and Post Fall Assessment	Fall risk assessment-1	• Assessment of clinical skills using checklist • OSCE

Clinical Unit	Duration (in Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
		Demonstrate skill in admission, transfer, and discharge of a patient	**Hospital Admission and discharge, Mobility and Immobility and Patient education** *Hospital Admission and discharge* Perform & Document: • Admission		• Assessment of clinical skills using checklist • OSCE
	2	Demonstrate skill in caring for patients with restricted mobility	*Mobility and Immobility* • Range of Motion Exercises • Assist patient in: oMoving ○ Turning ○ Logrolling • Changing position of helpless patient • Transferring (Bed to and from chair/wheelchair/ stretcher) *Patient education*	• Individual teaching-1	• Assessment of clinical skills using checklist • OSCE
	1	Plan and provide appropriate health teaching following the principles	**First aid and Emergencies** • Bandaging Techniques ○ Basic Bandages: ▪ Circular ▪ Spiral ▪ Reverse-Spiral ▪ Recurrent ▪ Figure of Eight ○ Special Bandages: ▪ Caplin ▪ Eye/Ear Bandage ▪ Jaw Bandage ▪ Shoulder Spica ▪ Thumb spica ▪ Triangular Bandage/ Sling (Head & limbs) ▪ Binders	• Module completion National Disaster Management Authority (NDMA) First Aid module (To complete it in clinicals if not completed during lab)	• Assessment of clinical skills using checklist • OSCE (first aid competencies)
		Demonstrate skills in assessing and performing First Aid during emergencies			

SYLLABUS

II SEMESTER

B.Sc. NURSING

APPLIED BIOCHEMISTRY

PLACEMENT: II SEMESTER

THEORY: 2 credits (40 hours) (includes lab hours also)

COURSE CODE: BIOC 135

COURSE DESCRIPTION: The course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body, its alterations in disease conditions and to apply this knowledge in the practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe the metabolism of carbohydrates and its alterations.
2. Explain the metabolism of lipids and its alterations.
3. Explain the metabolism of proteins and amino acids and its alterations.
4. Explain clinical enzymology in various disease conditions.
5. Explain acid base balance, imbalance and its clinical significance.
6. Describe the metabolism of hemoglobin and its clinical significance.
7. Explain different function tests and interpret the findings.
8. Illustrate the immunochemistry.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Describe the metabolism of carbohydrates and its alterations	**Carbohydrates** • Digestion, absorption and metabolism of carbohydrates and related disorders • Regulation of blood glucose • Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief • Investigations of Diabetes Mellitus ○ OGTT – Indications, Procedure, Interpretation and types of GTT curve ○ Mini GTT, extended GTT, GCT, IV GTT ○ HbA1c (Only definition) • Hypoglycemia – Definition & causes	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer

I	8 (T)	Describe the metabolism of carbohydrates and its alterations	**Carbohydrates** • Digestion, absorption and metabolism of carbohydrates and related disorders • Regulation of blood glucose • Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief • Investigations of Diabetes Mellitus ○ OGTT – Indications, Procedure, Interpretation and types of GTT curve ○ Mini GTT, extended GTT, GCT, IV GTT ○ HbA1c (Only definition) Hypoglycemia – Definition & causes	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer
II	8 (T)	Explain the metabolism of lipids and its alterations	**Lipids** • Fatty acids – Definition, classification • Definition & Clinical significance of MUFA & PUFA, Essential fatty acids, Trans fatty acids • Digestion, absorption & metabolism of lipids & related disorders • Compounds formed from cholesterol • Ketone bodies (name, types & significance only) • Lipoproteins – types & functions (metabolism not required) • Lipid profile • Atherosclerosis (in brief)	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Essay • Short answer • Very short answer

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III	9 (T)	Explain the metabolism of amino acids and proteins Identify alterations in disease conditions	**Proteins** • Classification of amino acids based on nutrition, metabolic rate with examples • Digestion, absorption & metabolism of protein & related disorders • Biologically important compounds synthesized from various amino acids (only names) • In born errors of amino acid metabolism – only aromatic amino acids (in brief) • Plasma protein – types, function & normal values • Causes of proteinuria, hypoproteinemia, hyper-gamma globinemia • Principle of electrophoresis, normal & abnormal electrophoretic patterns (in brief)	• Lecture cum Discussion • Explain using charts, models and slides	• Essay • Short answer • Very short answer
IV	4 (T)	Explain clinical enzymology in various disease conditions	**Clinical Enzymology** • Isoenzymes – Definition & properties • Enzymes of diagnostic importance in o Liver Diseases – ALT, AST, ALP, GGT o Myocardial infarction – CK, cardiac troponins, AST, LDH o Muscle diseases – CK, Aldolase o Bone diseases – ALP o Prostate cancer – PSA, ACP	• Lecture cum Discussion • Explain using charts and slides	• Essay • Short answer • Very short answer
V	3 (T)	Explain acid base balance, imbalance and its clinical significance	**Acid base maintenance** • pH – definition, normal value • Regulation of blood pH – blood buffer, respiratory & renal • ABG – normal values • Acid base disorders – types, definition & causes	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer

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VI	2 (T)	Describe the metabolism of hemoglobin and its clinical significance	**Heme catabolism** • Heme degradation pathway • Jaundice – type, causes, urine & blood investigations (van den berg test)	• Lecture cum Discussion • Explain using charts and slides	• Short answer • Very short answer
VII	3 (T)	Explain different function tests and interpret the findings	**Organ function tests (biochemical parameters & normal values only)** • Renal • Liver • Thyroid	• Lecture cum Discussion • Visit to Lab • Explain using charts and slides	• Short answer • Very short answer
VIII	3 (T)	Illustrate the immunochemistry	**Immunochemistry** • Structure & functions of immunoglobulin • Investigations & interpretation – ELISA	• Lecture cum Discussion • Explain using charts and slides • Demonstration of laboratory tests	• Short answer • Very short answer

Note: Few lab hours can be planned for observation and visits (Less than 1 credit, lab hours are not specified separately).

APPLIED NUTRITION AND DIETETICS

PLACEMENT: II SEMESTER
TIME-THEORY: 3 credits (60 hours) Theory: 45 hours, Lab: 15 hours
COURSE CODE: NUTR 140

COURSE DESCRIPTION: The course is designed to assist the students to acquire basic knowledge and understanding of the principles of Nutrition and Dietetics and apply this knowledge in the practice of Nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify the importance of nutrition in health and wellness.
2. Apply nutrient and dietary modifications in caring patients.
3. Explain the principles and practices of Nutrition and Dietetics.
4. Identify nutritional needs of different age groups and plan a balanced diet for them.
5. Identify the dietary principles for different diseases.
6. Plan therapeutic diet for patients suffering from various disease conditions.
7. Prepare meals using different methods and cookery rules.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Define nutrition and its relationship to Health	**Introduction to Nutrition** **Concepts** • Definition of Nutrition & Health • Malnutrition – Under Nutrition & Over Nutrition • Role of Nutrition in maintaining health • Factors affecting food and nutrition **Nutrients** • Classification • Macro & Micronutrients • Organic & Inorganic • Energy Yielding & Non-Energy Yielding **Food** • Classification – Food groups • Origin	• Lecture cum Discussion • Charts/Slides	• Essay • Short answer • Very short answer

II	3 (T)	Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates Explain BMR and factors affecting BMR	**Carbohydrates** • Composition – Starches, sugar and cellulose • Recommended Daily Allowance (RDA) • Dietary sources • Functions **Energy** • Unit of energy – Kcal • Basal Metabolic Rate (BMR) • Factors affecting BMR	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
III	3 (T)	Describe the classification, Functions, sources and RDA of proteins.	**Proteins** • Composition Eight essential amino acids • Functions • Dietary sources • Protein requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
IV	2 (T)	Describe the classification, Functions, sources and RDA of fats	**Fats** • Classification – Saturated & unsaturated • Calorie value • Functions • Dietary sources of fats and fatty acids • Fat requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer
V	3 (T)	Describe the classification, functions, sources and RDA of vitamins	**Vitamins** • Classification – fat soluble & water soluble • Fat soluble – Vitamins A, D, E, and K • Water soluble – Thiamine (vitamin B1), Riboflavin (vitamin B2), Nicotinic acid, Pyridoxine (vitamin B6), Pantothenic acid, Folic acid, Vitamin B12, Ascorbic acid (vitamin C) • Functions, Dietary Sources & Requirements – RDA of every vitamin	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Essay • Short answer • Very short answer

VI	3 (T)	Describe the classification, functions, sources and RDA of minerals	**Minerals** • Classification – Major minerals (Calcium, phosphorus, sodium, potassium and magnesium) and Trace elements • Functions • Dietary Sources • Requirements – RDA	• Lecture cum Discussion • Charts/Slides • Models • Display of food items	• Short answer • Very short answer
VII	7 (T) 8 (L)	Describe and plan balanced diet for different age groups, pregnancy, and lactation	**Balanced diet** • Definition, principles, steps • Food guides – Basic Four Food Groups • RDA – Definition, limitations, uses • Food Exchange System • Calculation of nutritive value of foods • Dietary fibre **Nutrition across life cycle** • Meal planning/Menu planning – Definition, principles, steps • Infant and Young Child Feeding (IYCF) guidelines – breast feeding, infant foods • Diet plan for different age groups – • Children, adolescents and elderly • Diet in pregnancy – nutritional requirements and balanced diet plan • Anemia in pregnancy – diagnosis, diet for anemic pregnant women, iron & folic acid supplementation and counseling • Nutrition in lactation – nutritional requirements, diet for lactating mothers, complementary feeding/ weaning	• Lecture cum Discussion • Meal planning • Lab session on ○ Preparation of balanced diet for different categories ○ Low cost nutritious dishes	• Short answer • Very short answer

VIII	6 (T)	Classify and describe the common nutritional deficiency disorders and identify nurses 'role in assessment, management and prevention	**Nutritional deficiency disorders** • Protein energy malnutrition – magnitude of the problem, causes, classification, signs & symptoms, Severe acute malnutrition (SAM), management & prevention and nurses 'role • Childhood obesity – signs & symptoms, assessment, management & prevention and nurses 'role • Vitamin deficiency disorders – vitamin A, B, C & D deficiency disorders –causes, signs & symptoms, management & prevention and nurses 'role • Mineral deficiency diseases – iron, iodine and calcium deficiencies –causes, signs & symptoms, management & prevention and nurses' role	• Lecture cum Discussion • Charts/Slides • Models	• Essay • Short answer • Very short answer
IX	4 (T) 7 (L)	Principles of diets in various diseases	**Therapeutic diets** • Definition, Objectives, Principles • Modifications – Consistency, Nutrients, • Feeding techniques. • Diet in Diseases – Obesity, Diabetes Mellitus, CVD, Underweight, Renal diseases, Hepatic disorders Constipation, Diarrhea, Pre and Post-operative period	• Lecture cum Discussion • Meal planning • Lab session on preparation of therapeutic diets	• Essay • Short answer • Very short answer
X	3 (T)	Describe the rules and preservation of nutrients	**Cookery rules and preservation of nutrients** • Cooking – Methods, Advantages and Disadvantages • Preservation of nutrients • Measures to prevent loss of nutrients during preparation • Safe food handling and Storage of foods • Food preservation • Food additives and food adulteration • Prevention of Food Adulteration Act (PFA) • Food standards	• Lecture cum Discussion • Charts/Slides	• Essay • Short answer • Very short answer

XI	4 (T)	Explain the methods of nutritional assessment and nutrition education	**Nutrition assessment and nutrition education** • Objectives of nutritional assessment • Methods of assessment – clinical examination, anthropometry, laboratory & biochemical assessment, assessment of dietary intake including Food frequency questionnaire (FFQ) method • Nutrition education – purposes, principles and methods	• Lecture cum Discussion • Demonstration • Writing nutritional assessment report	• Essay • Short answer • Evaluation of Nutritional assessment report
XII	3 (T)	Describe nutritional problems in India and nutritional programs	**National Nutritional Programs and role of nurse** • Nutritional problems in India • National nutritional policy • *National nutritional programs* – Vitamin A Supplementation, Anemia Mukt Bharat Program, Integrated Child Development Services (ICDS), Mid-day Meal Scheme (MDMS), National Iodine Deficiency Disorders Control Program (NIDDCP), Weekly Iron Folic Acid Supplementation (WIFS) and others as introduced • Role of nurse in every program	• Lecture cum Discussion	• Essay • Short answer • Very short answer
XIII	2 (T)	Discuss the importance of food hygiene and food safety Explain the Acts related to food safety	**Food safety** • Definition, Food safety considerations & measures • Food safety regulatory measures in India – Relevant Acts • Five keys to safer food • Food storage, food handling and cooking • General principles of food storage of food items (ex. milk, meat) • Role of food handlers in food borne diseases • Essential steps in safe cooking practices	• Guided reading on related acts	• Quiz • Short answer

NOTE: Food borne diseases and food poisoning are dealt in Community Health Nursing I.

NURSING FOUNDATION - II (including Health Assessment Module)

PLACEMENT: II SEMESTER

THEORY: 6 Credits (120 hours)

PRACTICUM: Skill Lab: 3 Credits (120 hours), Clinical: 4 Credits (320 hours)

COURSE CODE: N-NF(II) 125

COURSE DESCRIPTION: This course is designed to help novice nursing students develop knowledge and competencies required to provide evidence-based, comprehensive basic nursing care for adult patients, using nursing process approach.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding about fundamentals of health assessment and perform health assessment in supervised clinical settings
2. Demonstrate fundamental skills of assessment, planning, implementation and evaluation of nursing care using Nursing process approach in supervised clinical settings
3. Assess the Nutritional needs of patients and provide relevant care under supervision
4. Identify and meet the hygienic needs of patients
5. Identify and meet the elimination needs of patient
6. Interpret findings of specimen testing applying the knowledge of normal values
7. Promote oxygenation based on identified oxygenation needs of patients under supervision
8. Review the concept of fluid, electrolyte balance integrating the knowledge of applied physiology
9. Apply the knowledge of the principles, routes, effects of administration of medications in administering medication
10. Calculate conversions of drugs and dosages within and between systems of measurements
11. Demonstrate knowledge and understanding in caring for patients with altered functioning of sense organs and unconsciousness
12. Explain loss, death and grief
13. Describe sexual development and sexuality
14. Identify stressors and stress adaptation modes
15. Integrate the knowledge of culture and cultural differences in meeting the spiritual needs
16. Explain the introductory concepts relevant to models of health and illness in patient care

***Mandatory Module used in Teaching/Learning:**

Health Assessment Module: 40 hours

COURSE OUTLINE
T – Theory, SL – Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning	Assessment Methods
I	20 (T) 20 (SL)	Describe the purpose and process of health assessment and perform assessment under supervised clinical practice	**Health Assessment** • Interview techniques • Observation techniques • Purposes of health assessment • Process of Health assessment oHealth history ○ Physical examination: ▪ Methods: Inspection, Palpation, Percussion, Auscultation, Olfaction ▪ Preparation for examination: patient and unit ▪ General assessment ▪ Assessment of each body system ▪ Documenting health assessment findings	• Modular Learning ***Health Assessment Module** • Lecture cum Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE
II	13 (T) 8 (SL)	Describe assessment, planning, implementation and evaluation of nursing care using Nursing process approach	**The Nursing Process** • Critical Thinking Competencies, Attitudes for Critical Thinking, Levels of critical thinking in Nursing • Nursing Process Overview **Assessment** ▪ Collection of Data: Types, Sources, Methods ▪ Organizing Data ▪ Validating Data ▪ Documenting Data ○ **Nursing Diagnosis** ▪ Identification of client problems, risks and strengths ▪ Nursing diagnosis statement – parts, Types, Formulating, Guidelines for formulating Nursing Diagnosis ▪ NANDA approved diagnoses ▪ Difference between medical and nursing diagnosis	• Lecture • Discussion • Demonstration • Supervised Clinical Practice	• Essay • Short answer • Objective type • Evaluation of care plan

			o**Planning** ▪ Types of planning ▪ Establishing Priorities ▪ Establishing Goals and Expected Outcomes – Purposes, types, guidelines, Components of goals and outcome statements ▪ Types of Nursing Interventions, selecting interventions: Protocols and Standing Orders ▪ Introduction to Nursing Intervention Classification and Nursing Outcome Classification ▪ Guidelines for writing care plan o **Implementation** ▪ Process of Implementing the plan of care ▪ Types of care – Direct and Indirect o **Evaluation** ▪ Evaluation Process, Documentation and Reporting		
III	5 (T) 5 (SL)	Identify and meet the Nutritional needs of patients	**Nutritional needs** • Importance • Factors affecting nutritional needs • Assessment of nutritional status • *Review:* special diets – Solid, Liquid, Soft • *Review* on therapeutic diets • Care of patient with Dysphagia, Anorexia, Nausea, Vomiting Meeting Nutritional needs: Principles, equipment, procedure, indications Oral Enteral: Nasogastric/ Orogastric Introduction to other enteral feeds – types, indications, Gastrostomy, Jejunostomy Parenteral – TPN (Total Parenteral Nutrition)	• Lecture • Discussion • Demonstration • Exercise • Supervised Clinical practice	• Essay • Short answer • Objective type • Evaluation of nutritional assessment & diet planning

IV	5 (T) 15 (SL)	Identify and meet the hygienic needs of patients	**Hygiene** • Factors Influencing Hygienic Practice • Hygienic care: Indications and purposes, effects of neglected care ○ Care of the Skin – (Bath, feet and nail, Hair Care) ○ Care of pressure points ○ Assessment of Pressure Ulcers using Braden Scale and Norton Scale ○ Pressure ulcers – causes, stages and manifestations, care and prevention ○ Perineal care/Meatal care ○ Oral care, Care of Eyes, Ears and Nose including assistive devices (eye glasses, contact lens, dentures, hearing aid)	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE
V	10 (T) 10 (SL)	Identify and meet the elimination needs of patient	**Elimination needs** • Urinary Elimination ○ Review of Physiology of Urine Elimination, Composition and characteristics of urine ○ Factors Influencing Urination ○ Alteration in Urinary Elimination ○ Facilitating urine elimination: assessment, types, equipment, procedures and special considerations ○ Providing urinal/bed pan ○ Care of patients with ▪ Condom drainage ▪ Intermittent Catheterization ▪ Indwelling Urinary catheter and urinary drainage ▪ Urinary diversions ▪ Bladder irrigation	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • OSCE

			• Bowel Elimination ○ Review of Physiology of Bowel Elimination, Composition and characteristics of feces ○ Factors affecting Bowel elimination ○ Alteration in Bowel Elimination ○ Facilitating bowel elimination: Assessment, equipment, procedures ▪ Enemas ▪ Suppository ▪ Bowel wash ▪ Digital Evacuation of impacted feces ▪ Care of patients with Ostomies (Bowel Diversion Procedures)		
VI	3 (T) 4 (SL)	Explain various types of specimens and identify normal values of tests Develop skill in specimen collection, handling and transport	**Diagnostic testing** • Phases of diagnostic testing (pre-test, intra-test & post-test) in Common investigations and clinical implications ○ Complete Blood Count ○ Serum Electrolytes ○ LFT ○ Lipid/Lipoprotein profile ○ Serum Glucose – AC, PC, HbA1c ○ Monitoring Capillary Blood Glucose (Glucometer Random Blood Sugar – GRBS) ○ Stool Routine Examination ○ Urine Testing – Albumin, Acetone, pH, Specific Gravity ○ Urine Culture, Routine, Timed Urine Specimen ○ Sputum culture ○ Overview of Radiologic & Endoscopic Procedures	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

VII	11 (T) 10 (SL)	Assess patients for oxygenation needs, promote oxygenation and provide care during oxygen therapy	**Oxygenation needs** • Review of Cardiovascular and Respiratory Physiology • Factors affecting respiratory functioning • Alterations in Respiratory Functioning • Conditions affecting o Airway o Movement of air o Diffusion o Oxygen transport o Alterations in oxygenation o Nursing interventions to promote oxygenation: assessment, types, equipment used & procedure o Maintenance of patent airway o Oxygen administration o Suctioning – oral, tracheal o Chest physiotherapy – Percussion, Vibration & Postural drainage o Care of Chest drainage – principles & purposes o Pulse Oximetry – Factors affecting measurement of oxygen saturation using pulse oximeter, Interpretation o Restorative & continuing care o Hydration o Humidification o Coughing techniques o Breathing exercises o Incentive spirometry	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type

VIII	5 (T) 10 (SL)	Describe the concept of fluid, electrolyte balance	**Fluid, Electrolyte, and Acid – Base Balances** • Review of Physiological Regulation of Fluid, Electrolyte and Acid-Base Balances • Factors Affecting Fluid, Electrolyte and Acid-Base Balances • Disturbances in fluid volume: ○ Deficit ▪ Hypovolemia ▪ Dehydration ○ Excess ▪ Fluid overload ▪ Edema • Electrolyte imbalances (hypo and hyper) Acid-base imbalances Metabolic – acidosis & alkalosis Respiratory – acidosis & alkalosis Intravenous therapy Peripheral venipuncture sites Types of IV fluids Calculation for making IV fluid plan Complications of IV fluid therapy Measuring fluid intake and output Administering Blood and Blood components Restricting fluid intake Enhancing Fluid intake	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • Problem solving – calculations

IX	20 (T) 22 (SL)	Explain the principles, routes, effects of administration of medications Calculate conversions of drugs and dosages within and between systems of measurements Administer oral and topical medication and document accurately under supervision	**Administration of Medications** • Introduction – Definition of Medication, Administration of Medication, Drug Nomenclature, Effects of Drugs, Forms of Medications, Purposes, Pharmacodynamics and Pharmacokinetics • Factors influencing Medication Action • Medication orders and Prescriptions • Systems of measurement • Medication dose calculation • Principles, 10 rights of Medication Administration • Errors in Medication administration • Routes of administration • Storage and maintenance of drugs and Nurses responsibility • Terminologies and abbreviations used in prescriptions and medications orders • Developmental considerations • Oral, Sublingual and Buccal routes: Equipment, procedure • Introduction to Parenteral Administration of Drugs – Intramuscular, Intravenous, Subcutaneous, Intradermal: Location of site, Advantages and disadvantages of the specific sites, Indication and contraindications for the different routes and sites. • Equipment – Syringes & needles, cannulas, Infusion sets – parts, types, sizes • Types of vials and ampoules, Preparing Injectable medicines from vials and ampoules oCare of equipment: decontamination and disposal of syringes, needles, o Application to skin & mucous membrane	• Lecture • Discussion • Demonstration & Re-demonstration	• Essay • Short answer • Objective type • OSCE

			○ Direct application of liquids, Gargle and swabbing the throat ○ Insertion of Drug into body cavity: Suppository/ medicated packing in rectum/vagina ○ Instillations: Ear, Eye, Nasal, Bladder, and Rectal ○ Irrigations: Eye, Ear, Bladder, Vaginal and Rectal ○ Spraying: Nose and throat • Inhalation: Nasal, oral, endotracheal/tracheal (steam, oxygen and medications) – purposes, types, equipment, procedure, recording and reporting of medications administered • Other Parenteral Routes: Meaning of epidural, intrathecal, intraosseous, intraperitoneal, intra-pleural, intra- arterial		
X	5 (T) 6 (SL)	Provide care to patients with altered functioning of sense organs and unconsciousness in supervised clinical practice	**Sensory needs** • Introduction • Components of sensory experience – Reception, Perception & Reaction • Arousal Mechanism • Factors affecting sensory function • Assessment of Sensory alterations – sensory deficit, deprivation, overload & sensory poverty • Management oPromoting meaningful communication (patients with Aphasia, artificial airway & Visual and Hearing impairment) **Care of Unconscious Patients** • Unconsciousness: Definition, causes & risk factors, pathophysiology, stages of Unconsciousness, Clinical Manifestations • Assessment and nursing management of patient with unconsciousness, complications	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type

XI	4 (T) 6 (SL)	Explain loss, death and grief	**Care of Terminally ill, death and dying** • Loss – Types • Grief, Bereavement & Mourning • Types of Grief responses • Manifestations of Grief • Factors influencing Loss & Grief Responses • Theories of Grief & Loss – Kubler Ross • 5 Stages of Dying • The R Process model (Rando's) • Death – Definition, Meaning, Types (Brain & Circulatory Deaths) • Signs of Impending Death • Dying patient's Bill of Rights • Care of Dying Patient • Physiological changes occurring after Death • Death Declaration, Certification • Autopsy • Embalming • Last office/Death Care • Counseling & supporting grieving relatives • Placing body in the Mortuary • Releasing body from Mortuary • Overview – Medico-legal Cases, Advance directives, DNI/DNR, Organ Donation, Euthanasia	• Lecture • Discussion • Case discussions • Death care/last office	• Essay • Short answer • Objective type
			PSYCHOSOCIAL NEEDS (A-D)		
XII	3 (T)	Develop basic understanding of self-concept	**A. Self-concept** • Introduction • Components (Personal Identity, Body Image, Role Performance, Self Esteem) • Factors affecting Self Concept • Nursing Management	• Lecture • Discussion • Demonstration • Case Discussion/ Role play	• Essay • Short answer • Objective type

XIII	2 (T)	Describe sexual development and sexuality	**B. Sexuality** • Sexual development throughout life • Sexual health • Sexual orientation • Factors affecting sexuality • Prevention of STIs, unwanted pregnancy, avoiding sexual harassment and abuse • Dealing with inappropriate sexual behavior	• Lecture • Discussion	• Essay • Short answer • Objective type
XIV	2 (T) 4 (SL)	Describe stress and adaptation	**C. Stress and Adaptation – Introductory concepts** • Introduction • Sources, Effects, Indicators & Types of Stress • Types of stressors • Stress Adaptation – General Adaptation Syndrome (GAS), Local Adaptation Syndrome (LAS) • Manifestation of stress – Physical & psychological • Coping strategies/ Mechanisms • Stress Management ○ Assist with coping and adaptation ○ Creating therapeutic environment • Recreational and diversion therapies	• Lecture • Discussion	• Essay • Short answer • Objective type

XV	6 (T)	Explain culture and cultural norms Integrate cultural differences and spiritual needs in providing care to patients under supervision	**D. Concepts of Cultural Diversity and Spirituality** • Cultural diversity ○ Cultural Concepts – Culture, Subculture, Multicultural, Diversity, Race, Acculturation, Assimilation ○ Transcultural Nursing ○ Cultural Competence ○ Providing Culturally Responsive Care • Spirituality ○ Concepts – Faith, Hope, Religion, Spirituality, Spiritual Wellbeing ○ Factors affecting Spirituality ○ Spiritual Problems in Acute, Chronic, Terminal illnesses & Near-Death Experience ○ Dealing with Spiritual Distress/Problems	• Lecture • Discussion	• Essay • Short answer • Objective type
XVI	6 (T)	Explain the significance of nursing theories	**Nursing Theories: Introduction** • Meaning &Definition, Purposes, Types of theories with examples, Overview of selected nursing theories – Nightingale, Orem, Roy • Use of theories in nursing practice	• Lecture • Discussion	• Essay • Short answer • Objective type

CLINICAL PRACTICUM

Clinical: 4 Credits (320 hours)

PRACTICE COMPETENCIES: On completion of the course, the student will be able to

1. Perform health assessment of each body system
2. Develop skills in assessment, planning, implementation and evaluation of nursing care using Nursing process approach
3. Identify and meet the Nutritional needs of patients
4. Implement basic nursing techniques in meeting hygienic needs of patients
5. Plan and Implement care to meet the elimination needs of patient
6. Develop skills in instructing and collecting samples for investigation.
7. Perform simple lab tests and analyze & interpret common diagnostic values
8. Identify patients with impaired oxygenation and demonstrate skill in caring for patients with impaired oxygenation
9. Identify and demonstrate skill in caring for patients with fluid, electrolyte and acid – base imbalances
10. Assess, plan, implement & evaluate the basic care needs of patients with altered functioning of sense organs and unconsciousness
11. Care for terminally ill and dying patients

SKILL LAB

Use of Mannequins and Simulators

S.No.	Competencies	Mode of Teaching
1.	Health Assessment	Standardized Patient
2.	Nutritional Assessment	Standardized Patient
3.	Sponge bath, oral hygiene, perineal care	Mannequin
4.	Nasogastric tube feeding	Trainer/ Simulator
5.	Providing bed pan & urinal	Mannequin
6.	Catheter care	Catheterization Trainer
7.	Bowel wash, enema, insertion of	Simulator/ Mannequin
8.	Oxygen administration – face mask, venture mask, nasal prongs	Mannequin
9.	Administration of medication through Parenteral route – IM,	IM injection trainer, ID injection trainer, IV arm (Trainer)
10.	Last Office	Mannequin

CLINICAL POSTINGS – General Medical/Surgical Wards
(16 weeks × 20 hours per week = 320 hours)

Clinical Unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills (Supervised Clinical Practice)	Clinical Requirements	Assessment Methods
General Medical/ Surgical wards	3	Perform health assessment of each body system	**Health Assessment** • Nursing/Health history taking • Perform physical examination: oGeneral oBody systems • Use various methods of physical examination – Inspection, Palpation, Percussion, Auscultation, Olfaction • Identification of system wise deviations Documentation of findings	• History Taking – 2 • Physical examination – 2	• Assessment of clinical skills using checklist • OSCE
	1	Develop skills in assessment, planning, implementation and evaluation of nursing care using Nursing process approach	**The Nursing Process** • Prepare Nursing care plan for the patient based on the given case scenario	• Nursing process – 1	• Evaluation of Nursing process with criteria
		Identify and meet the Nutritional needs of patients	**Nutritional needs, Elimination needs& Diagnostic testing** *Nutritional needs* • Nutritional Assessment • Preparation of Nasogastric tube feed • Nasogastric tube feeding *Hygiene*	• Nutritional Assessment and Clinical Presentation – 1	• Assessment of clinical skills using checklist • OSCE

	2	Implement basic nursing techniques in meeting hygienic needs of patients	• Care of Skin & Hair: – Sponge Bath/ Bed bath – Care of pressure points & back massage • Pressure sore risk assessment using Braden/Norton scale – Hair wash – Pediculosis treatment • Oral Hygiene • Perineal Hygiene • Catheter care	• Pressure sore assessment – 1	
	2	Plan and Implement care to meet the elimination needs of patient Develop skills in	**Elimination needs** • Providing – Urinal – Bedpan • Insertion of Suppository • Enema • Urinary Catheter care • Care of urinary drainage **Diagnostic testing**	• Clinical Presentation on Care of patient with Constipation – 1 • Lab values – interpretation	• Assessment of clinical skills using checklist • OSCE
		Perform simple lab tests and analyze & interpret common diagnostic values	• Specimen Collection o Urine routine and culture oStool routine oSputum Culture • Perform simple Lab Tests using reagent strips o Urine – Glucose, Albumin, Acetone, pH, Specific gravity • Blood – GRBS Monitoring		

	3	Identify patients with impaired oxygenation and demonstrate skill in caring for patients with impaired oxygenation Identify and demonstrate skill in caring for patients with fluid, electrolyte and acid – base imbalances	**Oxygenation needs, Fluid, Electrolyte, and Acid – Base Balances** ***Oxygenation needs*** • Oxygen administration methods o Nasal Prongs o Face Mask/Venturi Mask • Steam inhalation • Chest Physiotherapy • Deep Breathing & Coughing Exercises • Oral Suctioning ***Fluid, Electrolyte, and Acid – Base Balances*** • Maintaining intake output chart • Identify & report complications of IV therapy • Observe Blood & Blood Component therapy		• Assessment of clinical skills using checklist • OSCE • Assessment of clinical skills using checklist • OSCE
	3	Explain the principles, routes, effects of administration of medications Calculate conversions of drugs and dosages within and between systems of Measurements Administer drugs by the following routes- Oral, Intradermal, Subcutaneous, Intramuscular, Intra Venous Topical, inhalation	**Administration of Medications** Calculate Drug Dosages Preparation of lotions & solutions Administer Medications Oral Topical Inhalations Parenteral ▪ Intradermal ▪ Subcutaneous ▪ Intramuscular Instillations ▪ Eye, Ear, Nose – instillation of medicated drops, nasal sprays, irrigations		• Assessment of clinical skills using checklist • OSCE

	2	Assess, plan, implement & evaluate the basic care needs of patients with altered functioning of sense organs and unconsciousness Care for terminally ill and dying patients	**Sensory Needs and Care of Unconscious patients, Care of Terminally ill, death and dying** *Sensory Needs and Care of Unconscious patients* • Assessment of Level of Consciousness using Glasgow Coma Scale *Terminally ill, death and dying* • Death Care	• Nursing rounds on care of patient with altered sensorium	• Assessment of clinical skills using checklist • OSCE • Assessment of clinical skills using checklist

HEALTH/NURSING INFORMATICS AND TECHNOLOGY

PLACEMENT: II SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICAL/LAB: 1 Credit (40 hours)

COURSE CODE: HNIT 145

DESCRIPTION: This course is designed to equip novice nursing students with knowledge and skills necessary to deliver efficient informatics-led health care services.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop a basic understanding of computer application in patient care and nursing practice.
2. Apply the knowledge of computer and information technology in patient care and nursing education, practice, administration and research.
3. Describe the principles of health informatics and its use in developing efficient healthcare.
4. Demonstrate the use of information system in healthcare for patient care and utilization of nursing data.
5. Demonstrate the knowledge of using Electronic Health Records (EHR) system in clinical practice.
6. Apply the knowledge of interoperability standards in clinical setting.
7. Apply the knowledge of information and communication technology in public health promotion.
8. Utilize the functionalities of Nursing Information System (NIS) system in nursing.
9. Demonstrate the skills of using data in management of health care.
10. Apply the knowledge of the principles of digital ethical and legal issues in clinical practice.
11. Utilize evidence-based practices in informatics and technology for providing quality patient care.
12. Update and utilize evidence-based practices in nursing education, administration, and practice.

COURSE OUTLINE

T – Theory, P/L – Lab

Unit	Time		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P/L				
I	10	15	Describe the importance of computer and technology in patient care and nursing practice	**Introduction to computer applications for patient care delivery system and nursing practice** Use of computers in teaching, learning, research and nursing practice	• Lecture • Discussion • Practice session • Supervised clinical practice on EHR use • Participate in data analysis using statistical package with statistician	(T) • Short answer • Objective type • Visit reports • Assessment of assignments
			Demonstrate the use of computer and technology in patient care, nursing education, practice, administration and research.	• Windows, MS office: Word, Excel, Power Point • Internet • Literature search • Statistical packages • Hospital management information system	• Visit to hospitals with different hospital management systems	(P) • Assessment of skills using checklist
II	4	5	Describe the principles of health informatics Explain the ways data, knowledge and information can be used for effective healthcare	**Principles of Health Informatics** • Health informatics – needs, objectives and limitations • Use of data, information and knowledge for more effective healthcare and better health	• Lecture • Discussion • Practical session • Work in groups with health informatics team in a hospital to extract nursing data and prepare a report	(T) • Essay • Short answer • Objective type questions • Assessment of report
III	3	5	Describe the concepts of information system in health Demonstrate the use of health information system in hospital setting	**Information Systems in Healthcare** • Introduction to the role and architecture of information systems in modern healthcare environments • Clinical Information System (CIS)/Hospital information System (HIS)	• Lecture • Discussion • Demonstration • Practical session • Work in groups with nurse leaders to understand the hospital information system	(T) • Essay • Short answer • Objective type

IV	4	4	Explain the use of electronic health records in nursing practice Describe the latest trend in electronic health records standards and interoperability	**Shared Care & Electronic Health Records** • Challenges of capturing rich patient histories in a computable form • Latest global developments and standards to enable lifelong electronic health records to be integrated from disparate systems.	• Lecture • Discussion • Practice on Simulated EHR system • Practical session • Visit to health informatics department of a hospital to understand the use of EHR in nursing practice • Prepare a report on current EHR standards in Indian setting	(T) • Essay • Short answer • Objective type (P) • Assessment of skills using checklist
V	3		Describe the advantages and limitations of health informatics in maintaining patient safety and risk management	**Patient Safety & Clinical Risk** • Relationship between patient safety and informatics • Function and application of the risk management process	• Lecture • Discussion	(T) • Essay • Short answer • Objective type
VI	3	6	Explain the importance of knowledge manageme nt Describe the standardized languages used in health informatics	**Clinical Knowledge & Decision Making** • Role of knowledge management in improving decision-making in both the clinical and policy contexts • Systematized Nomenclature of Medicine, Clinical Terms, SNOMED CT to ICD-10-CM Map, standardized nursing terminologies (NANDA, NOC), Omaha system.	• Lecture • Discussion • Demonstration • Practical session • Work in groups to prepare a report on standardized languages used in health informatics. • Visit health informatics department to understand the standardized languages used in hospital setting	(T) • Essay • Short answer • Objective type

VII	3		Explain the use of information and communication technology in patient care Explain the application of public health informatics	**eHealth: Patients and the Internet** • Use of information and communication technology to improve or enable personal and public healthcare • Introduction to public health informatics and role of nurses	• Lecture • Discussion • Demonstration	• Essay • Short answer • Objective type • Practical exam
VIII	3	5	Describe the functions of nursing information system Explain the use of healthcare data in management of health care organization	**Using Information in Healthcare Management** • Components of Nursing Information system(NIS) • Evaluation, analysis and presentation of healthcare data to inform decisions in the management of health-care organizations	• Lecture • Discussion • Demonstration on simulated NIS software • Visit to health informatics department of the hospital to understand use of healthcare data in decision making	(T) • Essay • Short answer • Objective type
IX	4		Describe the ethical and legal issues in healthcare informatics Explains the ethical and legal issues related to nursing informatics	**Information Law & Governance in Clinical Practice** • Ethical-legal issues pertaining to healthcare information in contemporary clinical practice • Ethical-legal issues related to digital health applied to nursing	• Lecture • Discussion • Case discussion • Role play	(T) • Essay • Short answer • Objective type
X	3		Explain the relevance of evidence-based practices in providing quality healthcare	**Healthcare Quality & Evidence Based Practice** • Use of scientific evidence in improving the quality of healthcare and technical and professional informatics standards	• Lecture • Discussion • Case study	(T) • Essay • Short answer • Objective type

SKILLS

- Utilize computer in improving various aspects of nursing practice.
- Use technology in patient care and professional advancement.
- Use data in professional development and efficient patient care.
- Use information system in providing quality patient care.
- Use the information system to extract nursing data.
- Develop skill in conducting literature review.

SYLLABUS

III SEMESTER

B.Sc. NURSING

APPLIED MICROBIOLOGY AND INFECTION CONTROL INCLUDING SAFETY

PLACEMENT: III SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICAL: 1 Credit (40 hours) (Lab/Experiential Learning – L/E)

COURSE CODE: MICR 201

SECTION A: APPLIED MICROBIOLOGY

THEORY: 20 hours

PRACTICAL: 20 hours (Lab/Experiential Learning – L/E)

DESCRIPTION: This course is designed to enable students to acquire understanding of fundamentals of Microbiology, compare and contrast different microbes and comprehend the means of transmission and control of spread by various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

COMPETENCIES: On completion of the course, the students will be able to:

1. Identify the ubiquity and diversity of microorganisms in the human body and the environment.
2. Classify and explain the morphology and growth of microbes.
3. Identify various types of microorganisms.
4. Explore mechanisms by which microorganisms cause disease.
5. Develop understanding of how the human immune system counteracts infection by specific and non-specific mechanisms.
6. Apply the principles of preparation and use of vaccines in immunization.
7. Identify the contribution of the microbiologist and the microbiology laboratory to the diagnosis of infection.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	3		Explain concepts and principles of microbiology and its importance in nursing	**Introduction:** • Importance and relevance to nursing • Historical perspective • Concepts and terminology • Principles of microbiology	• Lecture cum Discussion	• Short answer • Objective type
II	10	10 (L/E)	Describe structure, classification morphology and growth of bacteria Identify Microorganisms	**General characteristics of Microbes:** • Structure and classification of Microbes • Morphological types • Size and form of bacteria • Motility • Colonization • Growth and nutrition of microbes • Temperature • Moisture • Blood and body fluids • Laboratory methods for Identification of Microorganisms • Types of Staining – simple, differential (Gram's, AFB), special – capsular staining (negative), spore, LPCB, KOH mount. • Culture and media preparation – solid and liquid. Types of media – semi synthetic, synthetic, enriched, enrichment, selective and differential media. Pure culture techniques – tube dilution, pour, spread, streak plate. Anaerobic cultivation of bacteria	• Lecture cum Discussion • Demonstration • Experiential Learning through visual	• Short answer • Objective type

III	4	6 (L/E)	Describe the different disease producing organisms	**Pathogenic organisms** • Micro-organisms: Cocci – gram positive and gram negative; Bacilli – gram positive and gram negative • Viruses • Fungi: Superficial and Deep mycoses • Parasites • Rodents & Vectors o Characteristics, Source, portal of entry, transmission of infection, Identification of disease producing micro-organisms	• Lecture cum Discussion • Demonstration • Experiential learning through visual	• Short answer • Objective type
IV	3	4 (L/E)	Explain the concepts of immunity, hyper sensitivity and immunization	**Immunity** • Immunity: Types, classification • Antigen and antibody reaction • Hypersensitivity reactions • Serological tests • Immunoglobulins: Structure, types & properties • Vaccines: Types & classification, storage and handling, cold chain, Immunization for various diseases • Immunization Schedule	• Lecture • Discussion • Demonstration • Visit to observe vaccine storage • Clinical practice	• Short answer • Objective type • Visit report

SECTION B: INFECTION CONTROL & SAFETY

THEORY:
20 hours

PRACTICAL/LAB: 20 hours (Lab/Experiential Learning – L/E)

COURSE DESCRIPTION: This course is designed to help students to acquire knowledge and develop competencies required for fundamental patient safety and infection control in delivering patient care. It also focuses on identifying patient safety indicators, preventing and managing hospital acquired infections, and in following universal precautions.

COMPETENCIES: The students will be able to:

1. Develop knowledge and understanding of Hospital acquired Infections (HAI) and effective practices for prevention.
2. Integrate the knowledge of isolation (Barrier and reverse barrier) techniques in implementing various precautions.
3. Demonstrate and practice steps in Hand washing and appropriate use of different types of PPE.
4. Illustrate various disinfection and sterilization methods and techniques.
5. Demonstrate knowledge and skill in specimen collection, handling and transport to optimize the diagnosis for treatment.
6. Incorporate the principles and guidelines of Bio Medical waste management.
7. Apply the principles of Antibiotic stewardship in performing the nurses'role.
8. Identify patient safety indicators and perform the role of nurse in the patient safety audit process.
9. Apply the knowledge of International Patient Safety Goals (IPSG) in the patient care settings.
10. Identify employee safety indicators and risk of occupational hazards.
11. Develop understanding of the various safety protocols and adhere to those protocols.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	2	2 (E)	Summarize the evidence based and effective patient care practices for the prevention of common healthcare associated infections in the healthcare setting	**HAI (Hospital acquired Infection)** • Hospital acquired infection • Bundle approach - Prevention of Urinary Tract Infection (UTI) - Prevention of Surgical Site Infection (SSI) Prevention of Ventilator Associated events (VAE)	• Lecture & Discussion • Experiential learning	• Knowledge assessment • MCQ • Short answer

				- Prevention of Central Line Associated Blood Stream Infection (CLABSI) • Surveillance of HAI – Infection control team & Infection control committee		
II	3	4 (L)	Demonstrate appropriate use of different types of PPEs and the critical use of risk assessment	**Isolation Precautions and use of Personal Protective Equipment (PPE)** • Types of isolation system, standard precaution and transmission-based precautions (Direct Contact, Droplet, Indirect) • Epidemiology & Infection prevention – CDC guidelines • Effective use of PPE	• Lecture • Demonstration & Re-demonstration	• Performance assessment • OSCE
III	1	2 (L)	Demonstrate the hand hygiene practice and its effectiveness on infection control	**Hand Hygiene** • Types of Hand hygiene. • Hand washing and use of alcohol hand rub • Moments of Hand Hygiene • WHO hand hygiene promotion	• Lecture • Demonstration & Re-demonstration	• Performance assessment
IV	1	2 (E)	Illustrates disinfection and sterilization in the healthcare setting	**Disinfection and sterilization** • Definitions • Types of disinfection and sterilization • Environment cleaning • Equipment Cleaning • Guides on use of disinfectants • Spaulding ‘s principle	• Lecture • Discussion • Experiential learning through visit	• Short answer • Objective type

V	1		Illustrate on what, when, how, why specimens are collected to optimize the diagnosis for treatment and management .	**Specimen Collection (Review)** • Principle of specimen collection • Types of specimens • Collection techniques and special considerations • Appropriate containers • Transportation of the sample • Staff precautions in handling specimens	• Discussion	• Knowledge evaluation • Quiz • Performance assessment • Checklist
VI	2	2 (E)	Explain on Bio Medical waste management & laundry management	**BMW (Bio Medical Waste Management)** • Laundry management process and infection control and prevention • Waste management process and infection prevention • Staff precautions • Laundry management • Country ordinance and BMW National guidelines 2017: Segregation of wastes, Colour coded waste containers, waste collection & storage, Packaging & labeling, Transportation	• Discussion • Demonstration • Experiential learning through	• Knowledge assessment by short answers, objective type • Performance
VII	2		Explain in detail about Antibiotic stewardship, AMR Describe MRSA/ MDRO and its prevention	**Antibiotic stewardship** • Importance of Antibiotic Stewardship • Anti-Microbial Resistance • Prevention of MRSA, MDRO in healthcare setting	• Lecture • Discussion • Written assignment –Recent AMR (Antimicrobial resistance) guidelines	• Short answer • Objective type • Assessment of assignment

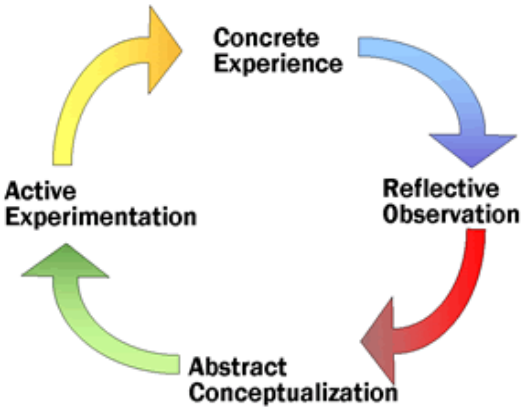
VIII	3	5 (L/E)	Enlist the patient safety indicators followed in a health care organization and the role of nurse in the patient safety audit process	**Patient Safety Indicators** • Care of Vulnerable patients • Prevention of Iatrogenic injury • Care of lines, drains and tubing's • Restrain policy and care – Physical and Chemical • Blood & blood transfusion policy • Prevention of IV Complication • Prevention of Fall • Prevention of DVT • Shifting and transporting of patients • Surgical safety • Care coordination event related to medication reconciliation and administration • Prevention of communication errors • Prevention of HAI • Documentation	• Lecture • Demonstration • Experiential learning	• Knowledge assessment • Performance assessment • Checklist/ OSCE
			Captures and analyzes incidents and events for quality improvement	**Incidents and adverse Events** • Capturing of incidents • RCA (Root Cause Analysis) • CAPA (Corrective and Preventive Action) • Report writing	• Lecture • Role play • Inquiry Based Learning	• Knowledge assessment • Short answer • Objective type

IX	1		Enumerate IPSG and application of the goals in the patient care settings.	**IPSG (International Patient safety Goals)** • Identify patient correctly • Improve effective communication • Improve safety of High Alert medication • Ensure safe surgery • Reduce the risk of health care associated infection • Reduce the risk of patient harm resulting from falls	• Lecture • Role play	• Objective type
X	2	3 (L/E)	Enumerate the various safety protocols and its applications	**Safety protocol** • 5S (Sort, Set in order, Shine, Standardize, Sustain) • Radiation safety • Laser safety • Fire safety - Types and classification of fire - Fire alarms - Firefighting equipment • HAZMAT (Hazardous Materials) safety - Types of spill - Spillage management - MSDS (Material Safety Data Sheets) • Environmental safety - Risk assessment - Aspect impact analysis - Maintenance of Temp and Humidity (Department wise) - Audits • Emergency Codes • Role of Nurse in times of disaster	• Lecture • Demonstration/ Experiential learning	• Mock drills • Post tests • Checklist

XI	2		Explain importance of employee safety indicators Identify risk of occupational hazards, prevention and post exposure prophylaxis	**Employee Safety Indicators** • Vaccination • Needle stick injuries (NSI) prevention • Fall prevention • Radiation safety • Annual health check **Healthcare Worker Immunization Program and management of occupational exposure** • Occupational health ordinance • Vaccination program for healthcare staff	• Lecture • Discussion • Lecture method • Journal review	• Knowledge assessment by short answers, • objective type • Short answer

***Experiential Learning:**

Experiential learning is the process by which knowledge is created through the process of experience in the clinical field. Knowledge results from the combination of grasping and transforming experience. (Kolb,1984). The experiential learning cycle begins with an experience that the student has had, followed by an opportunity to reflect on that experience. Then students may conceptualize and draw conclusions about what they experienced and observed, leading to future actions in which the students experiment with different behaviors. This begins the new cycle as the students have new experiences based on their experimentation. These steps may occur in nearly and order as the learning progresses. As per the need of the learner, the concrete components and conceptual components can be in different order as they may require a variety of cognitive and affective behavi



Kolb's Cycle of Experiential Learning

PHARMACOLOGY - I

PLACEMENT: III SEMESTER

THEORY: 1 Credit (20 hours)

COURSE CODE: PHAR (1) 205

COURSE DESCRIPTION: This course is designed to enable students to acquire understanding of Pharmacodynamics, Pharmacokinetics, principles of therapeutics and nursing implications.

COMPETENCIES: On completion of the course, the students will be able to

1. Describe pharmacodynamics and pharmacokinetics.
2. Review the principles of drug calculation and administration.
3. Explain the commonly used antiseptics and disinfectants.
4. Describe the pharmacology of drugs acting on the GI system.
5. Describe the pharmacology of drugs acting on the respiratory system.
6. Describe drugs used in the treatment of cardiovascular and blood disorders.
7. Explain the drugs used in the treatment of endocrine system disorders.
8. Describe the drugs acting on skin and drugs used to treat communicable diseases

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	3 (T)	Describe Pharmacodynamics, Pharmacokinetics, Classification, principles of administration of drugs	**Introduction to Pharmacology** • Definitions & Branches • Nature & Sources of drugs • Dosage Forms and Routes of drug administration • Terminology used • Classification, Abbreviations, Prescription, Drug Calculation, Weights and Measures • *Pharmacodynamics:* Actions, Drug Antagonism, Synergism, Tolerance, Receptors, Therapeutic, adverse, toxic effects, pharmacovigilance • *Pharmacokinetics:* Absorption, Bioavailability, Distribution, Metabolism, Interaction, Excretion • Review: Principles of drug administration and treatment individualization o Factors affecting dose, route etc. • Indian Pharmacopoeia: Legal Issues, Drug Laws, Schedule Drugs • Rational Use of Drugs • Principles of Therapeutics	• Lecture cum Discussion • Guided reading and written assignment on schedule K drugs	• Short answer • Objective type • Assessment of assignments
II	1 (T)	Describe antiseptics, and disinfectant & nurse's responsibilities	**Pharmacology of commonly used antiseptics and disinfectants** • Antiseptics and Disinfectants • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

III	2 (T)	Describe drugs acting on gastro-intestinal system & nurse's responsibilities	**Drugs acting on G.I. system** • Pharmacology of commonly used drugs ○ Emetics and Antiemetics ○ Laxatives and Purgatives ○ Antacids and antipeptic ulcer drugs ○ Anti-diarrhoeals – Fluid and electrolyte therapy, Furazolidone, dicyclomine • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
IV	2 (T)	Describe drugs acting on respiratory system & nurse's responsibilities	**Drugs acting on respiratory system** • Pharmacology of commonly used ○ Antiasthmatics – Bronchodilators (Salbutamol inhalers) ○ Decongestants ○ Expectorants, Antitussives and Mucolytics ○ Broncho-constrictors and Antihistamines • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

V	4 (T)	Describe drugs used on cardio-vascular system & nurse's responsibilities	**Drugs used in treatment of Cardiovascular system and blood disorders** • Hematinic, & treatment of anemia and antiadrenergic • Cholinergic and anticholinergic • Adrenergic Drugs for CHF & vasodilators • Antianginals • Antiarrhythmics • Antihypertensives • Coagulants & Anticoagulants • Antiplatelets & thrombolytics • Hypolipidemics • Plasma expanders & treatment of shock • Drugs used to treat blood disorders • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VI	2 (T)	Describe the drugs used in treatment of endocrine system disorders	**Drugs used in treatment of endocrine system disorders** • Insulin & oral hypoglycemics • Thyroid and anti-thyroid drugs • Steroids oCorticosteroids oAnabolic steroids • Calcitonin, parathormone, vitamin D3, calcium metabolism oCalcium salts	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

VII	1 (T)	Describe drugs used in skin diseases & nurse's responsibilities	**Drugs used in treatment of integumentary system** • Antihistaminics and antipruritics • Topical applications for skin- Benzylbenzoate, Gamma BHC, Clotrimazole, Miconazole, Silver Sulphadiazine (burns) • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VIII	5 (T)	Explain drug therapy/ chemotherapy of specific infections & infestations & nurse's responsibilities	**Drugs used in treatment of communicable diseases (common infections, infestations)** • General Principles for use of Antimicrobials • Pharmacology of commonly used drugs: oPenicillin, Cephalosporin's, Aminoglycosides, Macrolide & broad spectrum antibiotics, Sulfonamides, quinolones, Misc. antimicrobials • Anaerobic infections • Antitubercular drugs, • Antileprosy drugs • Antimalarials • Antiretroviral drugs • Antiviral agents • Antihelminthics, Antiscabies agents • Antifungal agents • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

PATHOLOGY - I

PLACEMENT: III SEMESTER

THEORY: 1 Credit (20 hours) (includes lab hours also)

COURSE CODE: PATH (I) 210

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology.
2. Rationalize the various laboratory investigations in diagnosing pathological disorders.
3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests.
4. Apply the knowledge of genetics in understanding the various pathological disorders.
5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities.
6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.
7. Demonstrate the understanding of various services related to genetics

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	8 (T)	Define the common terms used in pathology Identify the deviations from normal to abnormal structure and functions of body system	**Introduction** • Importance of the study of pathology • Definition of terms in pathology • Cell injury: Etiology, pathogenesis of reversible and irreversible cell injury, Necrosis, Gangrene • Cellular adaptations: Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia, Apoptosis • Inflammation: o Acute inflammation (Vascular and Cellular events, systemic effects of acute inflammation) o Chronic inflammation (Granulomatous inflammation, systemic effects of chronic inflammation) • Wound healing • Neoplasia**:** Nomenclature, Normal and Cancer cell, Benign and malignant tumors, Carcinoma in situ, Tumor metastasis: general mechanism, routes of spread and examples of each route • Circulatory disturbances: Thrombosis, embolism, shock • Disturbance of body fluids and electrolytes: Edema, Transudates and Exudates	• Lecture • Discussion • Explain using slides • Explain with clinical scenarios	• Short answer • Objective type
II	5 (T)	Explain pathological changes in disease conditions of various systems	**Special Pathology** **Pathological changes in disease conditions of selected systems:** **1. Respiratory system** • Pulmonary infections: Pneumonia, Lung abscess, pulmonary tuberculosis • Chronic Obstructive Pulmonary Disease: Chronic bronchitis, Emphysema, Bronchial Asthma, Bronchiectasis • Tumors of Lungs	• Lecture • Discussion • Explain using slides, X-rays and scans • Visit to pathology lab, endoscopy unit and OT	• Short answer • Objective type

			• **Cardio-vascular system**
			• Atherosclerosis
			• Ischemia and Infarction.
			• Rheumatic Heart Disease
			• Infective endocarditis
			• **Gastrointestinal tract**
			  • Peptic ulcer disease (Gastric and Duodenal ulcer)
			  • Gastritis-H Pylori infection
			  • Oral mucosa: Oral Leukoplakia, Squamous cell carcinoma
			  • Esophageal cancer
			  • Gastric cancer
			  • Intestinal: Typhoid ulcer, Inflammatory Bowel Disease (Crohn's disease and Ulcerative colitis), Colorectal cancer
			• **Liver, Gall Bladder and Pancreas**
			  • Liver: Hepatitis, Amoebic Liver abscess, Cirrhosis of Liver
			  • Gall bladder: Cholecystitis.
			  • Pancreas: Pancreatitis
			  • Tumors of liver, Gall bladder and Pancreas
			• **Skeletal system**
			  • Bone: Bone healing, Osteoporosis, Osteomyelitis, Tumors
			  • Joints: Arthritis - Rheumatoid arthritis and Osteoarthritis
			• **Endocrine system**
			  • Diabetes Mellitus
			  • Goitre
			  • Carcinoma thyroid		

III	7 (T)	Describe various laboratory tests in assessment and monitoring of disease conditions	**Hematological tests for the diagnosis of blood disorders** • Blood tests: Hemoglobin, White cell and platelet counts, PCV, ESR • Coagulation tests: Bleeding time (BT), Prothrombin time (PT), Activated Partial Prothrombin Time (APTT) • Blood chemistry • Blood bank: o Blood grouping and cross matching o Blood components o Plasmapheresis o Transfusion reactions **Note:** Few lab hours can be planned for observation and visits (Less than 1 credit, lab hours are not specified separately)	• Lecture • Discussion • Visit to clinical lab, biochemistry lab and blood bank	• Short answer • Objective type

ADULT HEALTH NURSING - I

WITH INTEGRATED PATHOPHYSIOLOGY (Including BCLS Module)

PLACEMENT: III SEMESTER

THEORY: 7 Credits (140 hours)

PRACTICUM: Lab/Skill Lab (SL) – 1 Credit (40 hours) Clinical – 6 Credits (480 hours)

COURSE CODE: N-AHN (I) 215

COURSE DESCRIPTION: This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach and critical thinking. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative care to patients with various Medical Surgical disorders.

COMPETENCIES: On completion of Medical Surgical Nursing I course, students will be able to

1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of common medical and surgical disorders.
2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of anatomy, physiology and diagnostic tests in the process of data collection.
3. Identify nursing diagnoses, list them according to priority and formulate nursing care plan.
4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.
5. Integrate knowledge of pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.
6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.
7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.
8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.
9. Identify the drugs used in treating patients with medical surgical conditions.
10. Plan and give relevant individual and group education on significant medical surgical topics.
11. Maintain safe environment for patients and the health care personnel in the hospital.
12. Integrate evidence-based information while giving nursing care to patients.

COURSE CONTENT

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	6 (T) 4 (L/SL)	Narrate the evolution of medical surgical nursing Apply nursing process in caring for patients with medical surgical problems Execute the role of a nurse in various medical surgical setting Develop skills in assessment and care of wound Develop competency in providing pre and postoperative care	**Introduction** • Evolution and trends of medical and surgical nursing • International classification of diseases • Roles and responsibility of a nurse in medical and surgical settings o Outpatient department o In-patient unit o Intensive care unit • Introduction to medical and surgical asepsis o Inflammation, infection o Wound healing – stages, influencing factors o Wound care and dressing technique • Care of surgical patient opre-operative opost-operative o Alternative therapies used in caring for patients with Medical Surgical Disorders	• Lecture cum discussion • Demonstration & Practice session • Role play • Visit to outpatient department, in patient and intensive care unit	• Short Answer • OSCE

II	15 (T) 4 (L/SL)	Explain organizational set up of the operating theatre Differentiate the role of scrub nurse and circulating nurse Describe the different positioning for various surgeries Apply principles of asepsis in handling the sterile equipment Demonstrate skill in scrubbing procedures Demonstrate skill in assessing the patient and document accurately the surgical safety checklist Develop skill in assisting with selected surgeries Explain the types, functions, and nursing considerations for different types of anesthesia	**Intraoperative Care** • Organization and physical set up of the operation theatre • Classification ○ O.T Design ○ Staffing ○ Members of the OT team ○ Duties and responsibilities of the nurse in OT • Position and draping for common surgical procedures • Instruments, sutures and suture materials, equipment for common surgical procedures • Disinfection and sterilization of equipment • Preparation of sets for common surgical procedures • Scrubbing procedures – Gowning, masking and gloving • Monitoring the patient during the procedures • Maintenance of the therapeutic environment in OT • Assisting in major and minor operation, handling specimen • Prevention of accidents and hazards in OT • Anesthesia – types, methods of administration, effects and stages, equipment & drugs • Legal aspects	• Lecture cum Discussio n • Demonstration, Practice session, and Case Discussion • Visit to receiving bay	• Caring for patient intra operativel y • Submit a list of disinfectants used for instruments with the action and precaution
III	6 (T) 4 (L/SL)	Identify the signs and symptoms of shock and electrolyte imbalances Develop skills in managing fluid and electrolyte imbalances	**Nursing care of patients with common signs and symptoms and management** • Fluid and electrolyte imbalance • Shock • Pain	• Lecture, discussion, demonstration • Case discussion	• Short answer • MCQ • Case report

		Perform pain assessment and plans for the nursing management			
IV	18 (T) 4 (L)	Demonstrate skill in respiratory assessment Differentiates different breath sounds and lists the indications Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of common respiratory problems Describe the health behaviour to be adopted in preventing respiratory illnesses	**Nursing Management of patients with respiratory problems** • Review of anatomy and physiology of respiratory system • Nursing Assessment – history taking, physical assessment and diagnostic tests • Common respiratory problems: ○ Upper respiratory tract infections ○ Chronic obstructive pulmonary diseases ○ Asthma ○ Pleural effusion, Empyema ○ Bronchiectasis ○ Pneumonia ○ Lung abscess ○ Cyst and tumors ○ Chest Injuries ○ Acute respiratory distress syndrome ○ Pulmonary embolism • Health behaviours to prevent respiratory illness	• Lecture, discussion, • Demonstration • Practice session • Case presentation • Visit to PFT Lab	• Essay • Short answer • OSCE

V	16 (T) 5 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of gastrointestinal disorders Demonstrate skill in gastrointestinal assessment Prepare patient for upper and lower gastrointestinal investigations Demonstrate skill in gastric decompression, gavage, and stoma care Demonstrate skill in different feeding techniques	**Nursing Management of patients with disorders of digestive system** • Review of anatomy and physiology of GI system • Nursing assessment –History and physical assessment • GI investigations • Common GI disorders: ○ Oral cavity: lips, gums and teeth ○ GI: Bleeding, Infections, Inflammation, tumors, Obstruction, Perforation & Peritonitis ○ Peptic & duodenal ulcer, ○ Mal-absorption, Appendicitis, Hernias ○ Hemorrhoids, fissures, Fistulas ○ Pancreas: inflammation, cysts, and tumors o Liver: inflammation, cysts, abscess, cirrhosis, portal hypertension, hepatic failure, tumors o Gall bladder: inflammation, Cholelithiasis, tumors • Gastric decompression, gavage and stoma care, different feeding techniques ○ Alternative therapies, drugs used in treatment of disorders of digestive system	• Lecture, Discussion • Demonstration, • Role play • Problem Based Learning • Visit to stoma clinic	• Short answer • Quiz • OSCE

VI	20 (T) 5 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of cardiovascular disorders Demonstrate skill in cardiovascular assessment Prepare patient for invasive and non- invasive cardiac procedures Demonstrate skill in monitoring and interpreting clinical signs related to cardiac disorders Complete BLS/BCLS module	**Nursing Management of patients with cardiovascular problems** • Review of anatomy and physiology of cardio-vascular system • Nursing Assessment: History and Physical assessment • Invasive & non-invasive cardiac procedures • Disorders of vascular system- Hypertension, arteriosclerosis, Raynaud's disease, aneurysm and peripheral vascular disorders • Coronary artery diseases: coronary atherosclerosis, Angina pectoris, myocardial infarction • Valvular disorders: congenital and acquired • Rheumatic heart disease: pericarditis, myocarditis, endocarditis, cardiomyopathies • Cardiac dysrhythmias, heart block • Congestive heart failure, corpulmonale, pulmonary edema, cardiogenic shock, cardiac tamponade • Cardiopulmonary arrest	• Lecture, discussion • Demonstration • Practice session • Case Discussion • Health education • Drug Book/ presentation • **Completion of BCLS Module**	• Care plan • Drug record • BLS/ BCLS evaluation
VII	7 (T) 3 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of hematological disorders Prepare and provides health education on blood donation Interpret blood reports	**Nursing Management of patients with disorders of blood** • Review of Anatomy and Physiology of blood • Nursing assessment: history, physical assessment & Diagnostic tests • Anemia, Polycythemia Bleeding Disorders: clotting factor defects and platelets defects, thalassemia, leukemia, leukopenia, agranulocytosis • Lymphomas, myelomas	• Field visit to blood bank • Counseling	• Interpretation of blood reports • Visit report

VIII	8 (T) 2 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of endocrine disorders Demonstrate skill in assessment of endocrine organ dysfunction Prepare and provides health education on diabetic diet Demonstrate skill in insulin administration	**Nursing management of patients with disorders of endocrine system** • Review of anatomy and physiology of endocrine system • Nursing Assessment – History and Physical assessment • Disorders of thyroid and Parathyroid, Adrenal and Pituitary (Hyper, Hypo, tumors) • Diabetes mellitus	• Lecture, discussion, demonstration • Practice session • Case Discussion • Health education	• Prepare health education on self-administration of insulin • Submits a diabetic diet plan
IX	8 (T) 2 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of disorders of integumentary system Demonstrate skill in integumentary assessment Demonstrate skill in medicated bath Prepare and provide health education on skin care	**Nursing management of patients with disorders of Integumentary system** • Review of anatomy and physiology of skin • Nursing Assessment: History and Physical assessment • Infection and infestations; Dermatitis • Dermatoses; infectious and Non-infectious • Acne, Allergies, Eczema & Pemphigus • Psoriasis, Malignant melanoma, Alopecia • Special therapies, alternative therapies • Drugs used in treatment of disorders of integumentary system	• Lecture, discussion • Demonstration • Practice session • Case Discussion	• Drug report • Preparation of Home care plan

X	16 (T) 4 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of musculoskeletal disorders Demonstrate skill in musculoskeletal assessment Prepare patient for radiological and non- radiological investigations of musculoskeletal system Demonstrate skill in crutch walking and splinting Demonstrate skill in care of patient with replacement surgeries Prepare and provide health education on bone healing	**Nursing management of patients with musculoskeletal problems** • Review of Anatomy and physiology of the musculoskeletal system • Nursing Assessment: History and physical assessment, diagnostic tests Musculoskeletal trauma: Dislocation, fracture, sprain, strain, contusion, amputation • Musculoskeletal infections and tumors: Osteomyelitis, benign and malignant tumour • Orthopedic modalities: Cast, splint, traction, crutch walking • Musculoskeletal inflammation: Bursitis, synovitis, arthritis • Special therapies, alternative therapies • Metabolic bone disorder: Osteoporosis, osteomalacia and Paget's disease • Spinal column defects and deformities – tumor, prolapsed intervertebral disc, Pott's spine • Rehabilitation, prosthesis • Replacement surgeries	• Lecture/ • Discussion • Demonstration • Case Discussion • Health education	• Nursing care plan • Prepare health teaching on care of patient with cast

XI	20 (T) 3 (L)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of patients with communicable diseases Demonstrate skill in barrier and reverse barrier techniques Demonstrate skill in execution of different isolation protocols	**Nursing management of patients with Communicable diseases** • Overview of infectious diseases, the infectious process • Nursing Assessment: History and Physical assessment, Diagnostic tests • Tuberculosis • Diarrhoeal diseases, hepatitis A- E, Typhoid • Herpes, chickenpox, Smallpox, Measles, Mumps, Influenza • Meningitis • Gas gangrene • Leprosy • Dengue, Plague, Malaria, Chikungunya, swine flu, Filariasis • Diphtheria, Pertussis, Tetanus, Poliomyelitis • COVID-19 • Special infection control measures: Notification, Isolation, Quarantine, Immunization	• Lecture, discussion, demonstration • Practice session • Case Discussion/ seminar • Health education • Drug Book/ presentation • **Refer TB Control** • **& Management module**	• Prepares and submits protocol on various isolation techniques

CLINICAL PRACTICUM

CLINICAL PRACTICUM: 6 Credits (480 hours) - 18 weeks × 27 hours

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will be able to apply nursing process and critical thinking in delivering holistic nursing care including rehabilitation to the adult patients undergoing surgery, with shock and fluid and electrolyte imbalance and with selected medical & surgical conditions i.e., Gastrointestinal, Respiratory, Endocrine, Orthopedic, Dermatology and Cardiovascular disorders.

The students will be competent to:

1. Utilize the nursing process in providing care to the sick adults in the hospital:
    a. Perform complete health assessment to establish a data base for providing quality patient care.
    b. Integrate the knowledge of diagnostic tests in the process of data collection.
    c. Identify nursing diagnoses and list them according to priority.
    d. Formulate nursing care plan, using problem solving approach.
    e. Apply scientific principles while giving nursing care to patients.
    f. Perform nursing procedures skillfully on patients.
    g. Establish/develop interpersonal relationship with patients and family members.
    h. Evaluate the expected outcomes and modify the plan according to the patient needs.
2. Provide comfort and safety to adult patients in the hospital.
3. Maintain safe environment for patients during hospitalization.
4. Explain nursing actions appropriately to the patients and family members.
5. Ensure patient safety while providing nursing procedures.
6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.
7. Provide pre, intra and post-operative care to patients undergoing surgery.
8. Integrate knowledge of pathology, nutrition and pharmacology for patients experiencing various medical and surgical disorders.
9. Integrate evidence-based information while giving nursing care to patients.
10. Demonstrate the awareness of legal and ethical issues in nursing practice.

I. NURSING MANAGEMENT OF PATIENTS WITH MEDICAL CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Intravenous therapy
- Oxygen through mask
- Oxygen through nasal prongs
- Venturi mask
- Nebulization
- Chest physiotherapy

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
General medical	4	Develop skill in intravenous injection administration and IV therapy Assist with diagnostic procedures Develop skill in the management of patients with Respiratory problems Develop skill in managing patients with metabolic abnormality	• Intravenous therapy o IV cannulation o IV maintenance and monitoring o Administration of IV medication • Care of patient with Central line • Preparation and assisting and monitoring of patients undergoing diagnostic procedures such as thoracentesis, Abdominal paracentesis *Management patients with respiratory problems* • Administration of oxygen through mask, nasal prongs, venturi mask • Pulse oximetry • Nebulization • Chest physiotherapy • Postural drainage • Oropharyngeal suctioning • Care of patient with chest drainage • Diet Planning o High Protein diet o Diabetic diet • Insulin administration o Monitoring GRBS	• Care Study – 1 • Health education • Clinical presentation/ Care • note) – 1	• Clinical evaluation • OSCE • Care Study evaluation • Care Note/ Clinical presentation

II. NURSING MANAGEMENT OF PATIENTS WITH SURGICAL CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Nasogastric aspiration
- Surgical dressing
- Suture removal
- Colostomy care/ileostomy care
- Enteral feeding

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
General surgical wards	4	Develop skill in caring for patients during pre- and post-operative period Assist with diagnostic procedures Develop skill in managing patient with Gastro-intestinal Problems Develop skill in wound management	• Pre-Operative care • Immediate Post-operative care • Post-operative exercise • Pain assessment • Pain Management • Assisting diagnostic procedure and after care of patients undergoing ○ Colonoscopy ○ ERCP ○ Endoscopy ○ Liver Biopsy	• Care study – 1 • Health teaching • Nasogastric aspiration • Gastrostomy/Jejunostomy feeds • Ileostomy/Colostomy care • Surgical dressing • Suture removal • Surgical soak • Sitz bath • Care of drain	• Clinical evaluation, OSCE • Care study • Care note/ Clinical presentation

III. NURSING MANAGEMENT OF PATIENTS WITH CARDIAC CONDITIONS

A. Skill Lab

Use of manikins and simulators

- Cardiovascular assessment
- Interpreting ECG
- BLS/BCLS
- CPR
- ABG analysis
- Taking blood sample
- Arterial blood gas analysis – interpretation

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Cardiology wards	2	Develop skill in management of patients with cardiac problems Develop skill in management of patients with disorders of Blood	• Cardiac monitoring • Recording and interpreting ECG • Arterial blood gas analysis – interpretation • Administer cardiac drugs • Preparation and after care of patients for cardiac catheterization • CPR • Collection of blood sample for: o Blood grouping/cross matching o Blood sugar o Serum electrolytes • Assisting with blood transfusion • Assisting for bone marrow aspiration • Application of anti-embolism stockings (TED hose) • Application/maintenance of sequential Compression device	• Cardiac assessment – 1 • Drug presentation – 1	• Clinical evaluation • Drug presentation

IV. NURSING MANAGEMENT OF PATIENTS WITH DISORDERS OF INTEGUMENTARY SYSTEM

A. Skill Lab

Use of manikins and simulators

Application of topical

medication

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Dermatology wards	1	Develop skill in management of patients with disorders of integumentary system	• Intradermal injection-Skin allergy testing • Application of topical medication • Medicated bath		Clinical evaluation

V. NURSING MANAGEMENT OF PATIENTS WITH COMMUNICABLE DISEASES

A. Skill Lab

- Barrier Nursing
- Reverse Barrier Nursing
- Standard precautions

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Isolation ward	1	Develop skill in the management of patients requiring isolation	• Barrier Nursing • Reverse barrier nursing • Standard precautions (Universal precaution), use of PPE, needle stick and sharp injury prevention, Cleaning and disinfection, Respiratory hygiene, waste disposal and safe injection practices)	Care Note – 1	Clinical evaluation Care note

VI. NURSING MANAGEMENT OF PATIENTS WITH MUSCULOSKELETAL PROBLEMS

A. Skill Lab

Use of manikins and simulators

- Range of motion exercises
- Muscle strengthening exercises
- Crutch walking

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Orthopedic wards	2	Develop skill in management of patients with musculoskeletal problems	• Preparation of patient with Myelogram/CT/MRI • Assisting with application & removal of POP/Cast • Preparation, assisting and after care of patient with Skin • traction/skeletal traction • Care of orthotics • Muscle strengthening exercises • Crutch walking • Rehabilitation	Care Note – 1	Clinical evaluation, Care note

VII. NURSING MANAGEMENT OF PATIENTS IN THE OPERATING ROOMS

A. Skill Lab

Use of manikins and simulators

- Scrubbing, gowning and gloving
- Orient to instruments for common surgeries
- Orient to suture materials
- Positioning

B. Clinical Postings

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Operation theatre	4	Develop skill in caring for intraoperative patients	• Position and draping • Preparation of operation table • Set up of trolley with instrument • Assisting in major and minor operation • Disinfection and sterilization of equipment • Scrubbing procedures – Gowning, masking and gloving • Intra operative monitoring	Assist as circulatory nurse – 4 Positioning & draping – 5 Assist as scrub nurse in major surgeries – 4 Assist as scrub nurse in minor surgeries – 4	Clinical evaluation OSCE

SYLLABUS

IV SEMESTER

B.Sc. NURSING

PHARMACOLOGY – II

including Fundamentals of Prescribing Module

PLACEMENT: IV SEMESTER

THEORY: 3 Credits (60 hours)

COURSE CODE: PHAR (II) 205

COURSE DESCRIPTION: This course is designed to enable students to acquire understanding of Pharmacodynamics,
Pharmacokinetics, principles of therapeutics & nursing implications. Further it develops understanding of fundamental
principles of prescribing in students.

COMPETENCIES: On completion of the course, the students will be able to

1. Explain the drugs used in the treatment of ear, nose, throat and eye disorders.
2. Explain the drugs used in the treatment of urinary system disorders.
3. Describe the drugs used in the treatment of nervous system disorders.
4. Explain the drugs used for hormonal replacement and for the pregnant women during antenatal, intra natal and postnatal
period.
5. Explain the drugs used to treat emergency conditions and immune disorders.
6. Discuss the role and responsibilities of nurses towards safe administration of drugs used to treat disorders of various
systems with basic understanding of pharmacology.
7. Demonstrate understanding about the drugs used in alternative system of medicine.
8. Demonstrate understanding about the fundamental principles of prescribing.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	4 (T)	Describe drugs used in disorders of ear, nose, throat and eye and nurses' responsibilities	**Drugs used in disorders of ear, nose, throat & Eye** • Antihistamines • Topical applications for eye (Chloramphenicol, Gentamycin eye drops), ear (Soda glycerin, boric spirit ear drops), nose and buccal cavity- chlorhexidine mouthwash • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
II	4 (T)	Describe drugs acting on urinary system & nurse's responsibilities	**Drugs used on urinary system** • Pharmacology of commonly used drugs • Renin angiotensin system o Diuretics and antidiuretics oDrugs toxic to kidney • Urinary antiseptics • Treatment of UTI – acidifiers and alkalinizers • Composition, action, dosage, route, indications, contraindications, Drug interactions, side effects, adverse effects toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
III	10 (T)	Describe drugs used on nervous system & nurse's responsibilities	**Drugs acting on nervous system** • Basis & applied pharmacology of commonly used drugs • Analgesics and anaesthetics • Analgesics: Non-steroidal anti-inflammatory (NSAID) drugs • Antipyretics • Opioids & other central analgesics • General (techniques of GA, pre anesthetic medication) & local anesthetics • Gases: oxygen, nitrous, oxide, carbon-dioxide & others • Hypnotics and sedatives • Skeletal muscle relaxants • Antipsychotics • oMood stabilizers	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Antidepressants • Antianxiety Drugs • Anticonvulsants • Drugs for neurodegenerative disorders & miscellaneous drugs • Stimulants, ethyl alcohol and treatment of methyl alcohol poisoning • Composition, action, dosage, route, indications, contraindications, drug interactions, side effects, adverse effects toxicity and role of nurse		
IV	5 (T)	Describe drugs used for hormonal disorder & supplementation, contraception & medical termination of pregnancy & nurse‘s responsibilities	• Drugs used for hormonal, disorders and supplementation, contraception and medical termination of pregnancy • Estrogens and progesterones • Oral contraceptives and hormone replacement therapy • Vaginal contraceptives • Drugs for infertility and medical termination of pregnancy • Uterine stimulants and relaxants • Composition, actions dosage route indications contraindications, drugs interactions, side effects, adverse effects, toxicity and role of nurse	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
V	3 (T)	Develop understanding about important drugs used for women before, during and after labour	• Drugs used for pregnant women during antenatal, labour and postnatal period • Tetanus prophylaxis • Iron and Vit K1 supplementation • Oxytocin, Misoprostol • Ergometrine • Methyl prostaglandin F2-alpha • Magnesium sulphate • Calcium gluconate	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type
VI	10 (T)	Describe drugs used in deaddiction, emergency, poisoning, vitamins & minerals supplementation, drugs used for immunization & immune-suppression & nurse‘s responsibilities	• Miscellaneous • Drugs used for deaddiction • Drugs used in CPR and emergency- adrenaline, Chlorpheniramine, hydrocortisone, Dexamethasone • IV fluids & electrolytes replacement • Common poisons, drugs used for treatment of poisoning • oActivated charcoal	• Lecture cum Discussion • Drug study/ presentation	• Short answer • Objective type

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Ipecac • Antidotes, • Anti-snake venom (ASV) • Vitamins and minerals supplementation • Vaccines & sera (Universal immunization program schedules) • Anticancer drugs: Chemotherapeutic drugs commonly used • Immuno-suppressants and Immunostimulants		
VII	4 (T)	Demonstrate awareness of common drugs used in alternative system of medicine	• Introduction to drugs used in alternative systems of medicine • Ayurveda, Homeopathy, Unani and Siddha etc. • Drugs used for common ailments	• Lecture cum Discussion • Observational visit	• Short answer • Objective type
VIII	20 (T)	Demonstrate understanding about fundamental principles of prescribing	• Fundamental principles of prescribing • Prescriptive role of nurse practitioners: Introduction • Legal and ethical issues related to prescribing • Principles of prescribing • Steps of prescribing • Prescribing competencies	• Completion of module on Fundamental principles of prescribing	• Short answer • Assignments evaluation

PATHOLOGY - II AND GENETICS

PLACEMENT: IV SEMESTER

THEORY: 1 Credit (20 hours) (Includes lab hours also)

COURSE CODE: PATH(II) 210

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge of pathology of various disease conditions, understanding of genetics, its role in causation and management of defects and diseases and to apply this knowledge in practice of nursing.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathology in understanding the deviations from normal to abnormal pathology
2. Rationalize the various laboratory investigations in diagnosing pathological disorders
3. Demonstrate the understanding of the methods of collection of blood, body cavity fluids, urine and feces for various tests
4. Apply the knowledge of genetics in understanding the various pathological disorders
5. Appreciate the various manifestations in patients with diagnosed genetic abnormalities
6. Rationalize the specific diagnostic tests in the detection of genetic abnormalities.
7. Demonstrate the understanding of various services related to genetics

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Explain pathological changes in disease conditions of various systems	**Special Pathology:** **Pathological changes in disease conditions of selected systems** **1. Kidneys and Urinary tract** • Glomerulonephritis • Pyelonephritis • Renal calculi • Cystitis • Renal Cell Carcinoma • Renal Failure (Acute and Chronic) **2. Male genital systems** • Cryptorchidism • Testicular atrophy • Prostatic hyperplasia • Carcinoma penis and Prostate. **3. Female genital system** • Carcinoma cervix • Carcinoma of endometrium • Uterine fibroids • Vesicular mole and Choriocarcinoma • Ovarian cyst and tumors **4. Breast** • Fibrocystic changes • Fibroadenoma • Carcinoma of the Breast **5. Central nervous system** • Meningitis. • Encephalitis • Stroke • Tumors of CNS	• Lecture • Discussion • Explain using slides, X-rays and scans • Visit to pathology lab, endoscopy unit and OT	• Short answer • Objective type

II	5 (T)	Describe the laboratory tests for examination of body cavity fluids, urine and faeces	**Clinical Pathology** • Examination of body cavity fluids: o Methods of collection and examination of CSF and other body cavity fluids (sputum, wound discharge) specimen for various clinical pathology, biochemistry and microbiology tests • Analysis of semen: o Sperm count, motility and morphology and their importance in infertility • Urine: o Physical characteristics, Analysis, Culture and Sensitivity • Faeces: o Characteristics o Stool examination: Occult blood, Ova, Parasite and Cyst, Reducing substance etc. Methods and collection of urine and faeces for various tests	• Lecture • Discussion • Visit to clinical lab and biochemistry lab	• Short answer • Objective type

GENETICS

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	2 (T)	Explain nature, principles and perspectives of heredity	**Introduction:** • Practical application of genetics in nursing • Impact of genetic condition on families • Review of cellular division: mitosis and meiosis • Characteristics and structure of genes • Chromosomes: sex determination • Chromosomal aberrations • Patterns of inheritance • Mendelian theory of inheritance • Multiple allots and blood groups • Sex linked inheritance • Mechanism of inheritance • Errors in transmission (mutation)	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
II	2 (T)	Explain maternal, prenatal and genetic influences on development of defects and diseases	**Maternal, prenatal and genetic influences on development of defects and diseases** • Conditions affecting the mother: genetic and infections • Consanguinity atopy • Prenatal nutrition and food allergies • Maternal age • Maternal drug therapy • Prenatal testing and diagnosis • Effect of Radiation, drugs and chemicals • Infertility • Spontaneous abortion • Neural Tube Defects and the role of folic acid in lowering the risks • Down syndrome (Trisomy 21)	• Lecture • Discussion • Explain using slides	• Short answer • Objective type

III	2 (T)	Explain the screening methods for genetic defects and diseases in neonates and children	**Genetic testing in the neonates and children** • Screening for ○ Congenital abnormalities ○ Developmental delay ○ Dysmorphism	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
IV	2 (T)	Identify genetic disorders in adolescents and adults	**Genetic conditions of adolescents and adults** • Cancer genetics: Familial cancer • Inborn errors of metabolism • Blood group alleles and hematological disorder • Genetic haemochromatosis • Huntington‘s disease • Mental illness	• Lecture • Discussion • Explain using slides	• Short answer • Objective type
V	2 (T)	Describe the role of nurse in genetic services and counselling	**Services related to genetics** • Genetic testing • Gene therapy • Genetic counseling • Legal and Ethical issues • Role of nurse	• Lecture • Discussion	• Short answer • Objective type

ADULT HEALTH NURSING - II WITH INTEGRATED PATHOPHYSIOLOGY INCLUDING GERIATRIC NURSING AND PALLIATIVE CARE MODULE

PLACEMENT: IV SEMESTER

THEORY: 7 Credits (140 hours)

COURSE CODE: N-AHN(II)225

PRACTICUM: Lab/Skill Lab (SL): 1 Credit (40 hours) Clinical: 6 Credits (480 hours)

COURSE DESCRIPTION: This course is designed to equip the students to review and apply their knowledge of Anatomy, Physiology, Biochemistry and Behavioral sciences in caring for adult patients with Medical/Surgical disorders using nursing process approach. It also intends to develop competencies required for assessment, diagnosis, treatment, nursing management, and supportive/palliative and rehabilitative care to adult patients with various Medical Surgical disorders.

COMPETENCIES: On completion of the course the students will apply nursing process and critical thinking in delivering holistic nursing care with selected Medical and Surgical conditions.

At the completion of Adult Health Nursing II course, students will

1. Explain the etiology, pathophysiology, manifestations, diagnostic studies, treatments and complications of selected common medical and surgical disorders.
2. Perform complete health assessment to establish a data base for providing quality patient care and integrate the knowledge of diagnostic tests in the process of data collection.
3. Identify diagnoses, list them according to priority and formulate nursing care plan.
4. Perform nursing procedures skillfully and apply scientific principles while giving comprehensive nursing care to patients.
5. Integrate knowledge of anatomy, physiology, pathology, nutrition and pharmacology in caring for patients experiencing various medical and surgical disorders.
6. Identify common diagnostic measures related to the health problems with emphasis on nursing assessment and responsibilities.
7. Demonstrate skill in assisting/performing diagnostic and therapeutic procedures.
8. Demonstrate competencies/skills to patients undergoing treatment for medical surgical disorders.
9. Identify the drugs used in treating patients with selected medical surgical conditions.
10. Plan and provide relevant individual and group education on significant medical surgical topics.
11. Maintain safe environment for patients and the health care personnel in the hospital.

COURSE OUTLINE

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	12 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and medical, surgical, nutritional and nursing management of patients with ENT disorders	**Nursing management of patient with disorders of Ear, Nose and Throat** (Includes etiology, pathophysiology, clinical manifestations, diagnostic measures and medical, surgical, nutritional and nursing management) • Review of anatomy and physiology of the ear, nose and throat • History, physical assessment, and diagnostic tests • **Ear** o External ear: deformities otalgia, foreign bodies and tumors o Middle ear: impacted wax, tympanic, membrane perforation, otitis media, and tumors o Inner ear: Meniere's disease, labyrinthitis, ototoxicity tumors • Upper respiratory airway infections: Rhinitis, sinusitis, tonsillitis, laryngitis • Epistaxis, Nasal obstruction, laryngeal obstruction • Deafness and its management	• Lecture and discussion • Demonstration of hearing aids, nasal packing, medication administration • Visit to audiology and speech clinic	• MCQ • Short answer • Essay • OSCE • Assessment of skill (using checklist) • Quiz • Drug book

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
II	12 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with disorders of eye Describe eye donation, banking and transplantation	**Nursing management of patient with disorder of eye** • Review of anatomy and physiology of the eye • History, physical assessment, diagnostic assessment **Eye Disorders** • Refractive errors • Eyelids: infection, deformities • Conjunctiva: inflammation and infection bleeding • Cornea: inflammation and infection • Lens: cataract • Glaucoma • Retinal detachment • Blindness • Eye donation, banking and transplantation	• Lecture and discussion • Demonstration of visual aids, lens, medication administration • Visit to eye bank	• MCQ • Short Essay • OSCE • Drug book
III	15 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of Kidney and urinary system disorders Demonstrate skill in genitourinary assessment Prepare patient for genitourinary investigations	**Nursing management of patient with Kidney and Urinary problems** • Review of Anatomy and physiology of the genitourinary system • History, physical assessment, diagnostic tests • Urinary tract infections: acute, chronic, lower, upper • Nephritis, nephrotic syndrome • Renal calculi • Acute and chronic renal failure • Disorders of ureter, urinary bladder and Urethra • Disorders of prostate: inflammation, infection, stricture, obstruction, and Benign Prostate Hypertrophy	• Lecture cum Discussion • Demonstration • Case Discussion • Health education • Drug book • Field visit – Visits hemodialysis unit	• MCQ • Short Note • Long essay • Case report • Submits health teaching on prevention of urinary calculi

IV	6 (T)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of male reproductive disorders	**Nursing management of disorders of male reproductive system** • Review of Anatomy and physiology of the male reproductive system • History, Physical Assessment, Diagnostic tests Infections of testis, penis and adjacent structures: Phimosis, Epididymitis, and Orchitis • Sexual dysfunction, infertility, contraception • Male Breast Disorders: gynecomastia, tumor, climacteric changes	• Lecture, Discussion • Case Discussion • Health education	• Short essay
V	10 (T) 4 (SL)	Explain the etiology, pathophysiology, clinical manifestations, types, diagnostic measures and management of patients with disorders of burns/cosmetic surgeries and its significance	**Nursing management of patient with burns, reconstructive and cosmetic surgery** • Review of anatomy and physiology of the skin and connective tissues • History, physical assessment, assessment of burns and fluid & electrolyte loss • Burns • Reconstructive and cosmetic surgery for burns, congenital deformities, injuries and cosmetic purposes, gender reassignment • Legal and ethical aspects • Special therapies: LAD, vacuumed dressing. Laser, liposuction, skin health rejuvenation, use of derma filters	• Lecture and discussion • Demonstration of burn wound assessment, vacuum dressing and fluid calculations • Visit to burn rehabilitation centers	• OSCE • Short notes

VI	16 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with neurological disorders	**Nursing management of patient with neurological disorders** • Review of anatomy and physiology of the neurological system • History, physical and neurological assessment, diagnostic tests • Headache, Head injuries • Spinal injuries: Paraplegia, Hemiplegia, Quadriplegia • Spinal cord compression: herniation of in vertebral disc • Intra cranial and cerebral aneurysms • Meningitis, encephalitis, brain, abscess, neuro-cysticercosis • Movement disorders: Chorea, Seizures & Epilepsies • Cerebrovascular disorders: CVA • Cranial, spinal neuropathies: Bell's palsy, trigeminal neuralgia • Peripheral Neuropathies • Degenerative diseases: Alzheimer's disease, Parkinson's disease • *Guillain-Barré syndrome*, Myasthenia gravis & Multiple sclerosis • Rehabilitation of patient with neurological deficit	• Lecture and discussion • Demonstration of physiotherapy, neuro assessment, tracheostomy care • Visit to rehabilitation center, long term care clinics, EEG, NCV study unit,	• OSCE • Short notes • Essay • Drug book

VII	12 (T) 4 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic tests, and medical, surgical, nutritional, and nursing management of immunological disorders Prepare and provides health education on prevention of HIV infection and rehabilitation Describe the national infection control programs	**Nursing management of patients with Immunological problems** • Review of Immune system • Nursing Assessment: History and Physical assessment • HIV & AIDS: Epidemiology, Transmission, Prevention of Transmission and management of HIV/AIDS • Role of Nurse; Counseling, Health education and home care consideration and rehabilitation • National AIDS Control Program – NACO, various national and international agencies for infection control	• Lecture, discussion • Case Discussion/ seminar • Refer Module on HIV/AIDS	
VIII	12 (T) 4 (L/SL)	Explain the etiology, pathophysiology, types, clinical manifestations, staging, diagnostic measures and management of patients with different cancer, treatment modalities including newer treatments	**Nursing management of patient with Oncological conditions** • Structure and characteristics of normal and cancer cells • History, physically assessment, diagnostic tests • Prevention screening early detections warning sign of cancer • Epidemiology, etiology classification, Pathophysiology, staging clinical manifestations, diagnosis, treatment modalities and medical and surgical nursing management of Oncological condition • Common malignancies of various body system eye, ear, nose, larynx, breast, cervix, ovary, uterus, sarcoma, renal, bladder, kidney, prostate Brain, Spinal cord. • Oncological emergencies • Modalities of treatment: Chemotherapy, Radiotherapy: Radiation safety, AERB regulations, Surgical intervention, Stem cell and	• Lecture and discussion • Demonstration of chemotherapy preparation and administration • Visit to BMT, radiotherapy units (linear accelerator, brachytherapy, etc.), nuclear medicine unit • Completion of palliative care module module during clinical hours (20 hours)	• OSCE • Essay • Quiz • Drug book • Counseling, health teaching

IX	15 (T) 4 (L/SL)	Explain the types, policies, guidelines, prevention and management of disaster and the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with acute emergencies	**Nursing management of patient in Emergency and Disaster situations** **Disaster Nursing** • Concept and principles of disaster nursing, Related Policies • Types of disaster: Natural and manmade • Disaster preparedness: Team, guidelines, protocols, equipment, resources • Etiology, classification, Pathophysiology, staging, clinical manifestation, diagnosis, treatment modalities and medical and surgical nursing management of patient with medical and surgical emergencies – Poly trauma, Bites, Poisoning and Thermal emergencies • Principles of emergency management • Medico legal aspects	• Lecture and discussion • Demonstration of disaster preparedness (Mock drill) and triaging • Filed visit to local disaster management centers or demo by fire extinguishers • Group presentation (role play, skit, concept mapping) on different emergency care • **Refer Trauma care management/ ATCN module** • Guided reading on National Disaster Management Authority (NDMA) guidelines	• OSCE • Case • presentations and case study
X	10 (T)	Explain the Concept, physiological changes, and psychosocial problems of ageing Describe the nursing management of the elderly	**Nursing care of the elderly** • History and physical assessment • Aging process and age-related body changes and psychosocial aspects • Stress and coping in elder patient • Psychosocial and sexual abuse of elderly • Role of family and formal and non- formal caregivers • Use of aids and prosthesis (hearing aids, dentures) • Legal and ethical issues • National programs for elderly, privileges, community programs and health services • Home and institutional care	• Lecture and discussion • Demonstration of communication with visual and hearing impaired • Field visit to old age homes	• OSCE • Case presentations • Assignment on family systems of India focusing on geriatric population

XI	15 (T) 8 (L/SL)	Explain the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients in critical care units	**Nursing management of patients in critical Care units** • Principles of critical care nursing • Organization: physical set-up, policies, staffing norms • Protocols, equipment and supplies • Use and application of critical care biomedical equipment: ventilators, cardiac monitors, defibrillators, infusion pump, Resuscitation equipment and any other • Advanced Cardiac Life support • Nursing management of critically ill patient • Transitional care • Ethical and Legal Aspects • Breaking Bad News to Patients and/or their families: Communication with patient and family • End of life care	• Lecture and discussion • Demonstration on the use of mechanical ventilators, cardiac monitors etc. • Clinical practice in different ICUs	• Objective type • Short notes • Case presentations • Assessment of skill on monitoring of patients in ICU. • Written assignment on ethical and legal issues in critical care
XII	5 (T)	Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with occupational/ industrial health disorders	**Nursing management of patients occupational and industrial disorders** • History, physical examination, Diagnostic tests • Occupational diseases and management	• Lecture and discussion • Industrial visit	• Assignment on industrial health hazards

CLINICAL PRACTICUM

CLINICAL PRACTICUM: 6 Credits (480 Hours) – **20 weeks × 24 hours**

PRACTICE COMPETENCIES: On completion of the clinical practicum, the students will develop proficiency in applying nursing process and critical thinking in rendering holistic nursing care including rehabilitation to the adult/geriatric patients admitted in Critical Care Units, undergoing cosmetic and reconstructive surgery and with selected medical & surgical disorders of ear, nose, throat, eye, Genitourinary, reproductive, immunologic, nervous systems and in emergency/disaster conditions.

The students will be competent to

1. Utilize the nursing process in providing care to the sick adults in the hospital
    a. Perform complete health assessment to establish a data base for providing quality patient care.
    b. Integrate the knowledge of diagnostic tests in patient assignment.
    c. Identify nursing diagnoses and list them according to priority.
    d. Formulate nursing care plan, using problem solving approach.
    e. Apply scientific principles while giving nursing care to patients.
    f. Develop skill in performing nursing procedures applying scientific principle.
    g. Establish/develop interpersonal relationship with patients and family members.
    h. Evaluate the expected outcomes and modify the plan according to the patient needs.
2. Provide comfort and safety to adult patients in the hospital.
3. Maintain safe environment for patients during hospitalization.
4. Explain nursing actions appropriately to the patients and family members.
5. Ensure patient safety while providing nursing procedures.
6. Assess the educational needs of the patient and their family related to medical and surgical disorders and provide appropriate health education to patients.
7. Provide pre, intra and post-operative care to patients undergoing surgery.
8. Integrate knowledge of pathology, nutrition and pharmacology for patients experiencing selected medical and surgical disorders.
9. Integrate evidence-based information while giving nursing care to patients.
10. Demonstrate the awareness of legal and ethical issues in nursing practice

I. Nursing Management of Patients with ENT Disorders

A. Skill Lab

Use of manikins and simulators

- Tracheostomy care
- Instilling Ear and Nasal medications
- Bandage application

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
ENT Ward and OPD	2	Provide care to patients with ENT disorders Educate the patients and their families	• Examination of ear, nose, throat and History taking • Applying bandages to Ear, Nose • Tracheostomy care • Preparation of patient, assisting and monitoring of patients undergoing diagnostic procedures ○ Auditory screening tests ○ **Audiometric tests** • Preparing the patient and assisting in special procedures like Anterior/ posterior nasal packing, Ear Packing and Syringing • Preparation and after care of patients undergoing ENT surgical procedures • Instillation of drops/medication	• ENT assessment –1 • Case study/ Clinical presentation – 1	• Clinical evaluation • OSCE • Case report study/ Clinical presentation

II. Nursing Management of Patients with Eye Conditions

A. Skill Lab

Use of manikins and simulators

- Instilling Eye medications
- Eye irrigation
- Eye bandage

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Ophthalmology unit	2	Develop skill in providing care to patients with Eye disorders	History taking, Examination of eyes and interpretation Assisting procedures Visual acuity Fundoscopy, retinoscopy, ophthalmoscopy, tonometry, Refraction tests ○ Refraction tests	• Eye assessment – 1 • Health teaching • Case study/ Clinical Presentation – 1	• Clinical evaluation • OSCE • Clinical presentation

		Educate the patient and their families	• Pre and post-operative care • Instillation of drops/ medication • Eye irrigation • Application of eye bandage • Assisting with foreign body		

III. Nursing Management of Patients with Kidney and Urinary System Disorders

A. Skill Lab

Use of manikins and simulators

- Assessment: kidney & urinary system
- Preparation: dialysis
- Catheterization and care

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Renal ward/ nephrology ward including Dialysis unit	2	Develop skill in Management of patients with urinary, male reproductive problems	• Assessment of kidney and urinary system ○ History taking ○ Physical examination ○ Testicular self-examination odigital rectal exam • Preparation and assisting with diagnostic and therapeutic procedures ○ Cystoscopy, Cystometrogram, ○ Contrast studies: IVP etc. ○ Peritoneal dialysis ○ Hemodialysis, ○ Lithotripsy ○ Specific tests: Semen analysis, gonorreoea test, Renal/ Prostate Biopsy etc. • Catheterization: care • Bladder irrigation • I/O recording and monitoring • Ambulation and exercise	• Assessment – 1 • Drug presentation – 1 • Care study/ Clinical presentation – 1 • Preparing and assisting in hemodialysis	• Clinical evaluation • Care plan • OSCE • Quiz • Drug presentation

IV. Nursing Management of Patients with Burns and Reconstructive Surgery

A. Skill Lab

Use of manikins and simulators

- Assessment of burns wound
- Wound dressing

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Burns unit/ reconstructive surgical unit	2	Develop skill in burns assessment and providing care to patients with different types of burns Develop skill in providing care to patients with different types of cosmetic and reconstructive surgeries	• Assessment of burns • First aid of burns • Fluid & electrolyte replacement therapy • Skin care • Care of Burn wounds – Bathing – Dressing • Pre-operative and post- operative care of patients • Caring of skin graft and post cosmetic surgery • Rehabilitation	• burn wound assessment – 1 • care study/case presentation – 1	• Clinical evaluation, • Care study/case report

V. Nursing Management of Patients with neurological disorders

A. Skill Lab

Use of manikins and simulators

- Range of motion exercises
- Muscle strengthening exercises
- Crutch walking

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Neurology medical/ Surgery wards	3	Develop skill in Management of patients with Neurological problems	• History taking; Neurological Examination • Patient monitoring • Prepare and assist for various invasive and non-invasive diagnostic procedures	Neuro-assessment –1 Case study/ case presentation – 1	• Clinical evaluation • Neuro assessment • OSCE

			• Range of motion exercises, muscle strengthening • Care of medical, surgical and rehabilitative patients	Drug presentation – 1	• presentations

VI. Nursing Management of Patients with Immunological Disorders

A. Skill Lab

- Barrier Nursing
- Reverse Barrier Nursing

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Isolation ward/ Medical ward	1	Develop skill in the Management of patients with immunological disorders	• History taking • Immunological status assessment (e.g. HIV) and Interpretation of specific tests • Caring of patients with low immunity • Practicing of standard safety measures, precautions/barrier nursing/reverse barrier/isolation skills	• Assessment of immune status • Teaching of isolation to patient and family care givers • Nutritional management • Care Note – 1	• Care note • Quiz • Health Teaching

VII. Nursing Management of Patients with disorders of Oncological conditions

A. Skill Lab

Use of manikins and simulators

- Application of topical medication
- Administration of chemotherapy

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Oncology wards (including day care radiotherapy unit)	3	Develop skill in providing care to patients with oncological disorders	• History taking & physical examination of cancer patients • Screening for common cancers: TNM classification • Preparation, assisting and after care patients undergoing diagnostic procedures – Biopsies/FNAC – Pap smear – Bone-marrow aspiration • Various modalities of treatment – Chemotherapy – Radiotherapy – Pain management – Stoma therapy – Hormonal therapy – Immuno-therapy – Gene therapy – Alternative therapy • Stoma care and feeding • Caring of patients treated with nuclear medicine • Rehabilitation	• Assessment – 1 • Care study/ clinical presentation – 1 • Pre and post-operative care of patient with various modes of cancer treatment • Teaching on BSE to family members • Visit to palliative care unit	• Clinical evaluation • Care study • Quiz • Drug book

VIII. Nursing Management of Patients in emergency conditions

A. Skill Lab

Use of manikins and simulators

- Assessment: primary and secondary survey
- Trauma care: bandaging, wound care, splinting, positions

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Emergency room/ Emergency unit	2	Develop skill in providing care to patients with emergency health problems	• Practicing ‗triage' • Primary and secondary survey in emergency • Examination, investigations & their interpretations, in emergency & disaster situations • Emergency care of medical and traumatic injury patients • Documentations, assisting in legal procedures in emergency unit • Managing crowd • Counseling the patient and family in dealing with grieving & bereavement	• Triage • Immediate care • Use of emergency trolley	• Clinical evaluation • Quiz

IX. Nursing Management of geriatric patients

A. Skill Lab

Use of manikins and simulators

- **Use of assistive safety devices**

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Geriatric ward	1	Develops skill in geriatric assessment and providing care to patients with geriatric illness	• History taking and assessment of Geriatric patient	• Geriatric assessment – 1 • Care of normal and geriatric patient with illness • Fall risk assessment – 1 • Functional status assessment – 1	• Clinical evaluation • Care plan

X. Nursing Management of Patients in critical care units

A. Skill Lab

Use of manikins and simulators

- Assessment critically ill
- ET tube set up –suction
- TT suction
- Ventilator set up
- Chest drainage
- Bag mask ventilation
- Central & Peripheral line
- Pacemaker

B. Clinical Postings

Clinical area/unit	Duration (weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Critical Care Unit	2	Develop skill in assessment of critically ill and providing care to patients with critical health conditions	• Assessment of critically ill patients • Assisting in arterial puncture, ET tube intubation & extubation • ABG analysis & interpretation - respiratory acidosis, respiratory alkalosis, metabolic acidosis, metabolic alkalosis • Setting up of Ventilator modes and settings and care of patient on a ventilator • Set up of trolley with instruments • Monitoring and maintenance of Chest drainage system • Bag and mask ventilation • Assisting and maintenance of Central and peripheral lines invasive • Setting up of infusion pump, defibrillator, • Drug administration-infusion, intracardiac, intrathecal, epidural, • Monitoring pacemaker • ICU care bundle • Management of the dying patient in the ICU	• Hemodynamic monitoring • Different scales used in ICU • Communicating with critically ill patients	• Clinical evaluation • OSCE • RASS scale assessment • Use of VAE bundle VAP, CAUTI, BSI • Case Presentation

PROFESSIONALISM, PROFESSIONAL VALUES & ETHICS INCLUDING BIOETHICS

PLACEMENT: IV SEMESTER

THEORY: 1 Credit (20 hours)

COURSE CODE: PROF 230

COURSE DESCRIPTION: This course is designed to help students to develop an understanding of professionalism and demonstrate professional behavior in their workplace with ethics and professional values. Further the students will be able to identify ethical issues in nursing practice and participate effectively in ethical decision making along with health team members.

COMPETENCIES: On completion of this course, the students will be able to

1. Describe profession and professionalism.
2. Identify the challenges of professionalism.
3. Maintain respectful communication and relationship with other health team members, patients and society.
4. Demonstrate professional conduct.
5. Describe various regulatory bodies and professional organizations related to nursing.
6. Discuss the importance of professional values in patient care.
7. Explain the professional values and demonstrate appropriate professional values in nursing practice.
8. Demonstrate and reflect on the role and responsibilities in providing compassionate care in the healthcare setting.
9. Demonstrate respect, human dignity and privacy and confidentiality to self, patients and their caregivers and other health team members.
10. Advocate for patients'wellbeing, professional growth and advancing the profession.
11. Identify ethical and bioethical concerns, issues and dilemmas in nursing and healthcare.
12. Apply knowledge of ethics and bioethics in ethical decision making along with health team members.
13. Protect and respect patient's rights.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	5 (T)	Discuss nursing as a profession Describe the concepts and attributes of professionalism Identify the challenges of professionalism Maintain respectful communication and relationship with other health team members, patients and society Demonstrate professional conduct Respect and maintain professional boundaries between patients, colleagues and society Describe the roles and responsibilities of regulatory bodies and professional organizations	**PROFESSIONALISM** • Profession • Definition of profession • Criteria of a profession • Nursing as a profession **Professionalism** • Definition and characteristics of professionalism • Concepts, attributes and indicators of professionalism ***Challenges of professionalism*** • Personal identity vs professional identity • Preservation of self-integrity: threat to integrity, Deceiving patient: withholding information and falsifying records • Communication & Relationship with team members: Respectful and open communication and relationship pertaining to relevant interests for ethical decision making • Relationship with patients and society **Professional Conduct** • Following ethical principles • Adhering to policies, rules and regulation of the institutions • Professional etiquettes and behaviours • Professional grooming: Uniform, Dress code • Professional boundaries: Professional relationship with the patients, caregivers and team members **Regulatory Bodies & Professional Organizations: Roles & Responsibilities** • *Regulatory bodies*: Indian Nursing Council, State Nursing Council • *Professional Organizations:* Trained Nurses Association of India (TNAI), Student Nurses Association (SNA), Nurses League of Christian Medical Association of India, International Council of Nurses (ICN) and International Confederation of Midwives	• Lecture cum Discussion • Debate • Role play • Case based discussion • Lecture cum Discussion • Visit to INC, SNC, TNAI	• Short answer • Essay • Objective type

II	5 (T)	Discuss the importance of professional values Distinguish between personal values and professional values Demonstrate appropriate professional values in nursing practice	• Regulatory Bodies & Professional • Organizations: Roles & Responsibilities • Regulatory bodies: Indian Nursing • Council, State Nursing Council • Professional Organizations: Trained • Nurses Association of India (TNAI), • Student Nurses Association (SNA), • Nurses League of Christian Medical • Association of India, International • Council of Nurses (ICN) and • International **PROFESSIONAL VALUES** • Values: Definition and characteristics of values • Value clarification • Personal and professional values • Professional socialization: Integration of professional values with personal values **Professional values in nursing** • Importance of professional values in nursing and health care • Caring: definition, and process • Compassion: Sympathy Vs empathy, Altruism • Conscientiousness • Dedication/devotion to work • Respect for the person- Human dignity • Privacy and confidentiality: Incidental disclosure • Honesty and integrity: Truth telling • Trust and credibility: Fidelity, Loyalty • Advocacy: Advocacy for patients, work environment, nursing education and practice, and for advancing the profession	• Lecture cum Discussion • Value clarification exercise • Interactive learning • Story telling • Sharing experiences • Scenario based discussion	• Short answer • Essay • Assessment of student‘s behavior with patients and families

III	10 (T)	Define ethics & bioethics
		
		Explain ethical principles
		
		Identify ethical concerns
		
		Ethical issues and dilemmas in health care
			ETHICS & BIOETHICS
			Definitions: Ethics, Bioethics and Ethical Principles
			• Beneficence
			• Non-maleficence: Patient safety, protecting patient from harm, Reporting errors
			• Justice: Treating each person as equal
			• Care without discrimination, equitable access to care and safety of the public
			• Autonomy: Respects patients' autonomy, Self-determination, Freedom of choice
			Ethical issues and ethical dilemma: **Common ethical problems**
			• Conflict of interest
			• Paternalism
			• Deception
			• Privacy and confidentiality
			• Valid consent and refusal
			• Allocation of scarce nursing resources
			• Conflicts concerning new technologies
			• Whistle-blowing
			• *Beginning of life issues*
			  • Abortion
			  • Substance abuse
			  • Fetal therapy
			  • Selective deduction
			  • Intrauterine treatment of fetal conditions
			  • Mandated contraception
			  • Fetal injury
			  • Infertility treatment
			• *End of life issues*
			  • End of life
			  • Euthanasia
			  • Do Not Resuscitate (DNR)
				• Lecture cum discussion
				• Group discussion with examples
				• Flipping/ self-directed learning
				• Role play
				• Story telling
				• Sharing experiences
				• Case based Clinical discussion
				• Role modeling
				• Group exercise on ethical decision-making following steps on a given scenario
				• Assignment
					• Short answer
					• Essay
					• Quiz
					• Reflective diary
					• Case report
					• Attitude test
					• Assessment of assignment

		ethical decision making and apply knowledge of ethics and bioethics in making ethical decisions stipulated by ICN INC	• *Issues related to psychiatric care* ○ Non-compliance ○ Restrain and seclusion ○ Refuse to take food **Process of ethical decision making** • Assess the situation (collect information) • Identify the ethical problem • Identify the alternative decisions • Choose the solution to the ethical decision • Implement the decision • Evaluate the decision **Ethics committee: Roles and responsibilities** • Clinical decision making • Research **Code of Ethics** • International Council of Nurses (ICN) • Indian Nursing Council		

		Discuss the rights of the patients and families to make decisions about care Protect and respect patients' rights	**Patients' Bill of Rights-17 patients' rights (MoH&FW, GoI)** 1. Right to emergency medical care 2. Right to safety and quality care according to standards 3. Right to preserve dignity 4. Right to nondiscrimination 5. Right to privacy and confidentiality 6. Right to information 7. Right to records and reports 8. Right to informed consent 9. Right to second opinion 10. Right to patient education 11. Right to choose alternative treatment options if available 12. Right to choose source for obtaining medicines or tests 13. Right to proper referral and transfer, which is free from perverse commercial influences 14. Right to take discharge of patient or receive body of deceased from hospital 15. Right to information on the rates to be charged by the hospital for each type of service provided and facilities available on a prominent display board and a brochure 16. Right to protection for patients involved in clinical trials, biomedical and health research 17. Right to be heard and seek redressal		

SYLLABUS

V SEMESTER

B.Sc. NURSING

CHILD HEALTH NURSING - I

PLACEMENT: V SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Lab/Skill Lab: 1 Credit (40 hours) Clinical: 2 Credits (160 hours)

COURSE CODE: N-CHN(I)301

COURSE DESCRIPTION: This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

COMPETENCIES: On completion of the course, the students will be able to

1. Develop understanding of the history and modern concepts of child health and child-care.
2. Explore the national child welfare services, national programs and legislation in the light of National Health Policy 2017.
3. Describe the role of preventive pediatrics and perform preventive measures towards accidents.
4. Participate in national immunization programs/Universal Immunization Program (UIP).
5. Identify the developmental needs of children and provide parental guidance.
6. Describe the principles of child health nursing and perform child health nursing procedures.
7. Demonstrate competencies in newborn assessment, planning and implementation of care to normal and high-risk newborn including neonatal resuscitation.
8. Apply the principles and strategies of Integrated management of neonatal and childhood illness (IMNCI).
9. Apply the knowledge of pathophysiology and provide nursing care to children with respiratory system disorders.
10. Identify and meet childhood emergencies and perform child CPR.

COURSE OUTLINE

T – Theory, L/SL – Lab/Skill Lab

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	10 (T) 10 (L)	Explain the modern concept of child-care Describe National policy, programs and legislation in relation to child health & welfare Describe role of preventive pediatrics	**Introduction**: **Modern concepts of child- care** ○ Historical development of child health ○ Philosophy and modern concept of child-care ○ Cultural and religious considerations in child-care ○ National policy and legislations in relation to child health and welfare ○ National programs and agencies related to welfare services to the children ○ Internationally accepted rights of the child ○ Changing trends in hospital care, preventive, promotive and curative aspect of child health ○ *Preventive pediatrics:* •Concept •Immunization Immunization programs and cold chain. ○ Care of under-five and Under-five Clinics/Well-baby clinics ○ Preventive measures towards accidents ○ Child morbidity and mortality rates ○ Difference between an adult and child which affect response to illness •Physiolgica •Psycholoical Social •Immunological ○ bereavement ○ The role of a child health nurse in caring for a hospitalized child	• Lecture Discussion • Demonstration of common pediatric procedures	• Short answer • Objective type • Assessment of skills with checklist

		List major causes of death during infancy, early & late childhood Differentiate between an adult and child in terms of illness and response Describe the major functions & role of the pediatric nurse in caring for a hospitalized child. Describe the principles of child health nursing and perform child health nursing procedures	• Principles of pre and postoperative care of infants and children. *Child Health Nursing procedures:* • Administration of medication: oral, I/M, & I/V • Calculation of fluid requirement • Application of restraints • Assessment of pain in children. o FACES pain rating scale o FLACC scale ○ Numerical scale		
II	12 (T)	Describe the normal growth and development of children at different ages Identify the needs of children at different ages & provide parental guidance Identify the nutritional needs of children at different ages & ways of meeting needs Identify the role of play for normal & sick children	**The Healthy Child** Definition and principles of growth and development Factors affecting growth and development Growth and development from birth to adolescence Growth and developmental theories (Freud, Erickson, Jean Piaget, Kohlberg) The needs of normal children through the stages of developmental and parental guidance Nutritional needs of children and infants • breast feeding • exclusive breast feeding • Supplementary/artificial feeding and weaning Baby friendly hospital concept Types and value of play and selection of play material	• Lecture Discussion • Demonstration • Developmental study of infant and children • Observation study of normal & sick child • Field visit to Anganwadi, child guidance clinic • Videos on breast feeding • Clinical practice/field • Refer/consult MAA mothers Absolute Affection program for Breast feeding module (National guideline)	• Short answer • Objective type • Assessment of field visits and developmental study reports

III	15 (T) 20 (L)	Provide care to normal and high-risk neonates Perform neonatal resuscitation Recognize and manage common neonatal problems	**Nursing care of neonate:** • Appraisal of Newborn • Nursing care of a normal newborn/essential newborn care • Neonatal resuscitation • Nursing management of low birth weight baby • Kangaroo mother care • Nursing management of common neonatal disorder - Hyperbilirubinemia - Hypothermia - Hyperthermia - Metabolic disorder - Neonatal infections - Neonatal seizures - Respiratory distress syndrome - Retinopathy of Prematurity • Organization of neonatal care unit • Neonatal equipment	• Modular based teaching**: ENBC and FBNC module (oral drills, videos, self-evaluation exercises)** • Workshop on neonatal resuscitation: NRP module • Demonstration • Practice Session • Clinical practice • Lecture Discussion	• OSCE • Short answer • Objective type
IV	10 (T) 5 (L)	Apply principles and strategies of IMNCI	**Integrated management of neonatal and childhood Illnesses**	*Modular based teaching:* **IMNCI module** • Clinical practice/field	• OSCE
V	8 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with disorders of respiratory, and endocrine system	**Nursing management in common childhood diseases** **Respiratory system**: • Identification and Nursing management of congenital malformations • Congenital disorders: Tracheoesophageal fistula, Diaphragmatic hernia	• Lecture Discussion • Demonstration • Practice session • Clinical practice	• Short answer • Objective type • Assessment of skills with checklist

			• Others: Acute naso-pharyngitis, Tonsillitis, Croup, Bronchitis, Bronchiolitis, Pneumonia, Asthma **Endocrine system**: • Juvenile Diabetes mellitus, Hypo-thyroidism		
VI	5 (T) 5 (L)	Develop ability to meet child- hood emergencies and perform child CPR	**Childhood emergencies** • Accidents – causes and prevention, Poisoning, Foreign bodies, Hemorrhage, Burns and Drowning • PLS (AHA Guidelines)	• Lecture • Discussion • Demonstration • PLS Module/ Workshop	• OSCE

CHILD HEALTH NURSING - I & II CLINICAL (3 Credits – 240 hours)

PLACEMENT: V & VI SEMESTER

PRACTICUM: Skill Lab: 1 Credit (40 hours)

Clinical: V SEMESTER – 2 Credits (160 hours)

VI SEMESTER – 1 Credit (80 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to

1. Perform assessment of children: health, developmental & anthropometric.
2. Provide nursing care to children with various medical disorders.
3. Provide pre-& postoperative care to children with common pediatric surgical conditions/ malformation.
4. Perform immunization as per NIS.
5. Provide nursing care to critically ill children.
6. Give health education/nutritional education to parents.
7. Counsel parents according to identified counseling needs.

Skill Lab

Use of Manikins and Simulators PLS, CPAP, Endotracheal Suction

Pediatric Nursing Procedures:

- Administration of medication – Oral, IM & IV
- Oxygen administration
- Application of restraints
- Specimen collection
- Urinary catheterization and drainage
- Ostomy care
- Feeding – NG, gastrostomy, Jejunostomy
- Wound dressing
- Suture removal

CLINICAL POSTINGS
8 weeks × 30 hours per week (5 weeks + 3 weeks)

Clinical area/unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods

Pediatric Medical Ward	**V Sem – 2 weeks**
	
	VI Sem – 1 week
		• Provide nursing care to children with various medical disorders	• Taking pediatric history
			• Physical examination & assessment of children
			• Administration of oral, I/M, & I/V medicine/fluids
			• Calculation of fluid replacement
			• Preparation of different strengths of I/V fluids
			• Application of restraints
			• Administration of O_2 inhalation by different methods
			• Baby bath/sponge bath
			• Feeding children by Katori spoon, Paladai cup
			• Collection of specimens for common investigations
			• Assisting with common diagnostic procedures
			• Teaching mothers/ parents
			  ○ Malnutrition
			  ○ Oral rehydration therapy
			  ○ Feeding & Weaning
			  ○ Immunization schedule
			• Play therapy
				• Nursing care plan – 1
				• Case study presentation – 1
				• Health talk – 1
					• Assess performance with rating scale
					• Assess each skill with checklist OSCE/OSPE
					• Evaluation of case study/ presentation & health education session
					• Completion of activity record

Pediatric Surgical Ward	**V Sem – 2 weeks** **VI Sem – 1 week**	• Recognize different pediatric surgical conditions/ malformations • Provide pre & post-operative care to children with common paediatric surgical conditions/ malformation • Counsel & educate parents	Calculation, preparation & administration of I/V fluids Bowel wash, insertion of suppositories Care for ostomies: Colostomy Irrigation Ureterostomy gastrostomy Enterostomy Urinary catheterization & drainage Feeding Naso-gastric Gastrostomy Jejunostomy Care of surgical wounds • Dressing Suture removal	• Nursing care plan – 1 • Case study/ presentation – 1	• Assess performance with rating scale • Assess each skill with checklist OSCE/OSPE • Evaluation of case study/ presentation • Completion of activity record
Pediatric OPD/ Immunization room	**V Sem – 1 week**	• Perform assessment of children: health, developmental & anthropometric • Perform immunization • Give health education/ nutritional education	• Assessment of children ○ Health assessment ○ Developmental assessment o Anthropometric assessment o Nutritional assessment • Immunization • Health/Nutritional education	• Growth and developmental study: Infant – 1 Toddler – 1 Preschooler – 1 Schooler – 1 Adolescent – 1	• Assess performance with rating scale • Completion of activity record.

NICU & PICU	**VI Sem – 1 week**	• Provide nursing care to critically ill children	• Care of a baby in incubator/warmer • Care of a child on ventilator, CPAP • Endotracheal Suction • Chest Physiotherapy • Administration of fluids with infusion pumps • Total Parenteral Nutrition • Phototherapy • Monitoring of babies • Recording & reporting • Cardiopulmonary Resuscitation (PLS)	• Newborn assessment – 1 • Nursing Care Plan – 1	Assess performance with rating scale • Evaluation of observation report • Completion of activity record

MENTAL HEALTH NURSING – I

PLACEMENT: V SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Clinical: 1 Credit (80 hours)

COURSE CODE: N-MHN(I)-305

COURSE DESCRIPTION: This course is designed to develop basic understanding of the principles and standards of mental health nursing and skill in application of nursing process in assessment and care of patients with mental health disorders.

COMPETENCIES: On completion of the course, the students will be competent to

1. Trace the historical development of mental health nursing and discuss its scope.
2. Identify the classification of the mental disorders.
3. Develop basic understanding of the principles and concepts of mental health nursing
4. Apply the Indian Nursing Council practice standards for psychiatric mental health nursing in supervised clinical settings.
5. Conduct mental health assessment.
6. Identify and maintain therapeutic communication and nurse patient relationship.
7. Demonstrate knowledge of the various treatment modalities and therapies used in mental disorders.
8. Apply nursing process in delivering care to patients with mental disorders.
9. Provide nursing care to patients with schizophrenia and other psychotic disorders based on assessment findings and treatment/therapies used.
10. Provide nursing care to patients with mood disorders based on assessment findings and treatment/therapies used.
11. Provide nursing care to patients with neurotic disorders based on assessment findings and treatment/ therapies used

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T)	Describe the historical development & current trends in mental health nursing Discuss the scope of mental health nursing Describe the concept of normal & abnormal behaviour	**Introduction** • Perspectives of Mental Health and Mental Health Nursing, evolution of mental health services, treatments and nursing practices • Mental health team • Nature & scope of mental health nursing • Role & functions of mental health nurse in various settings and factors affecting the level of nursing practice • Concepts of normal and abnormal behaviour	• Lecture cum Discussion	• Essay • Short answer
II	10 (T)	Define the various terms used in mental health Nursing Explain the classification of mental disorders Explain the psychodynamics of maladaptive behaviour Discuss the etiological factors & psychopathology of mental disorders Explain the principles and standards of Mental health Nursing Describe the conceptual models of mental health nursing	**Principles and Concepts of Mental Health Nursing** • Definition: mental health nursing and terminology used • Classification of mental disorders: ICD11, DSM5, Geropsychiatry manual classification • Review of personality development, defense mechanisms • Etiology bio-psycho-social factors • Psychopathology of mental disorders: review of structure and function of brain, limbic system and abnormal neurotransmission • Principles of Mental health Nursing • Ethics and responsibilities • Practice Standards for Psychiatric Mental Health Nursing (INC practice standards) • Conceptual models and the role of nurse: oExistential model ○ Psychoanalytical models ○ Behavioural model ○ Interpersonal model Preventive psychiatry and rehabilitation	• Lecture cum Discussion • Explain using Charts • Review of personality development	• Essay • Short answer

III	6 (T)	Describe nature, purpose and process of assessment of mental health status	**Mental Health Assessment** • History taking • Mental status examination • Mini mental status examination • Neurological examination • Investigations: Related Blood chemistry, EEG, CT & MRI • Psychological tests	• Lecture cum Discussion • Demonstration • Practice session • Clinical practice	• Essay • Short answer • Assessment of mental health status
IV	6 (T)	Identify therapeutic communication & techniques Describe therapeutic relationship Describe therapeutic impasses and its interventions	**Therapeutic Communication and Nurse- Patient Relationship** • Therapeutic communication: Types, techniques, characteristics and barriers • Therapeutic nurse-patient relationship • Interpersonal relationship- • Elements of nurse patient contract, • Review of technique of IPR- Johari window • Therapeutic impasse and its management	• Lecture cum Discussion • Demonstration • Role Play • Process recording • Simulation (video)	• Essay • Short answer • OSCE
V	10 (T)	Explain treatment modalities and therapies used in mental disorders and role of the nurse	**Treatment modalities and therapies used in mental disorders** • **Physical therapies**: Psychopharmacology, • Electro Convulsive therapy • **Psychological Therapies**: Psychotherapy, Behaviour therapy, CBT • **Psychosocial**: Group therapy, Family therapy, Therapeutic Community, Recreational therapy, Art therapy (Dance, Music etc), Occupational therapy • **Alternative & Complementary**: Yoga, Meditation, Relaxation • **Consideration for special populations**	• Lecture cum Discussion • Demonstration • Group work • Practice session • Clinical practice	• Essay • Short answer • Objective type

VI	8 (T)	Describe the etiology, psycho-dynamics/ pathology, clinical manifestations, diagnostic criteria and management of patients with Schizophrenia, and other psychotic disorders	**Nursing management of patient with Schizophrenia, and other psychotic disorders** • Prevalence and incidence • Classification • Etiology, psychodynamics, clinical manifestation, diagnostic criteria/formulations **Nursing process** • Nursing Assessment: History, Physical and mental assessment • Treatment modalities and nursing management of patients with Schizophrenia and other psychotic disorders • Geriatric considerations and considerations for special populations Follow up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
VII	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with mood disorders	**Nursing management of patient with mood disorders** • Prevalence and incidence • Mood disorders: Bipolar affective disorder, mania depression and dysthymia etc. • Etiology, psycho dynamics, clinical manifestation, diagnosis • Nursing Assessment History, Physical and mental assessment • Treatment modalities and nursing management of patients with mood disorders • Geriatric considerations/ considerations for special populations • Follow-up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems

VIII	8 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with neurotic, stress related and somatization disorders	**Nursing management of patient with neurotic, stress related and somatization disorders** • Prevalence and incidence • classifications • Anxiety disorders – OCD, PTSD, Somatoform disorders, Phobias, Dissociative and Conversion disorders • Etiology, psychodynamics, clinical manifestation, diagnostic criteria/ formulations • Nursing Assessment: History, Physical and mental assessment • Treatment modalities and nursing management of patients with neurotic and stress related disorders • Geriatric considerations/ considerations for special populations • Follow-up and home care and rehabilitation	• Lecture and Discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient managemen t problems

CLINICAL PRACTICUM

MENTAL HEALTH NURSING - I & II

PLACEMENT: SEMESTER V & VI

MENTAL HEALTH NURSING - I – 1 Credit (80 hours)

MENTAL HEALTH NURSING - II – 2 Credits (160 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Assess patients with mental health problems/disorders
2. Observe and assist in various treatment modalities or therapies
3. Counsel and educate patients and families
4. Perform individual and group psychoeducation
5. Provide nursing care to patients with mental health problems/disorders
6. Motivate patients in the community for early treatment and follow up
7. Observe the assessment and care of patients with substance abuse disorders in deaddiction centre.

CLINICAL POSTINGS

(8 weeks × 30 hours per week = 240 hours)

Clinical Area/Unit	Duration (Weeks)	Learning Outcomes	Skills/Procedural Competencies	Clinical Requirements	Assessments Methods
Psychiatric OPD	2	Assess patients with mental health problems Observe and assist in therapies Counsel and educate patients, and families	• History taking • Perform mental status examination (MSE) • Observe/practice Psychometric assessment • Perform Neurological examination • Observing and assisting in therapies • Individual and group psycho- education • Mental hygiene practice education • Family psycho-education	• History taking and Mental status examination – 2 • Health education – 1 • Observation report of OPD	• Assess performance with rating scale • Assess each skill with checklist • Evaluation of health education • Assessment of observation report • Completion of activity record
Child Guidance clinic	1	Assess children with various mental health problems Counsel and educate children, families and significant others	• History & mental status examination • Observe/practice psychometric assessment • Observe and assist in various therapies • Parental teaching for child with mental deficiency		Assess performance with rating scale Assess each skill with checklist Evaluation of the observation report
Inpatient ward	4	• Assess patients with mental health problems • Provide nursing care for patients with various	• History taking • Mental status examination (MSE) • Neurological examination • Assisting in psychometric	• Give care to 2-3 patients with various mental disorders • Case study – 1	• Assess performance with rating scale • Assess each skill with checklist

		mental health problems • Assist in various therapies • Counsel and educate patients, families and significant others	assessment • Recording therapeutic communication • Administration of medications • Assist Electro-Convulsive Therapy (ECT) • Participating in all therapies • Preparing patients for Activities of Daily Living (ADL) • Conducting admission and discharge counselling • Counseling and teaching patients and families	• Care plan • Clinical presentation – 1 • Process recording – 2 • Maintain drug book	• Evaluation of the case study, care plan, clinical presentation, process recording • Completion of activity record
Community psychiatry & Deaddiction centre	1	• Identify patients with various mental disorders • Motivate patients for early treatment and follow up • Assist in follow up clinic • Counsel and educate patient, family and community • Observe the assessment and care of patients at deaddiction centre	• Conduct home visit and case work • Identifying individuals with mental health problems • Assisting in organizations of Mental Health camp • Conducting awareness meetings for mental health & mental illness • Counseling and Teaching family members, patients and community • Observing deaddiction care	• Case work – 1 • Observation report on field visits • Visit to deaddiction centre	• Assess performance with rating scale • Evaluation of case work and observation report • Completion of activity record

COMMUNITY HEALTH NURSING - I

including Environmental Science & Epidemiology

PLACEMENT: V SEMESTER

THEORY: 5 Credits (100 hours) includes Lab hours also

PRACTICUM: Clinical: 2 Credits (160 hours)

COURSE CODE: N-COMH(I)-310

COURSE DESCRIPTION: This course is designed to help students develop broad perspectives of health, its determinants, about community health nursing and understanding about the health care delivery services, health care policies and regulations in India. It helps the students to develop knowledge and understanding of environmental science. It further helps them to apply the principles and concepts of BCC and health education for health promotion and maintenance of health within the community in wellness and illness continuum. It helps students to practice Community Health Nursing for the individuals, family and groups at rural, urban and tribal settings by applying principles of community health nursing and epidemiological approach. It also helps the students to develop knowledge and competencies required to screen, assess, diagnose, manage and refer clients appropriately in various health care settings. It prepares the students to provide primary healthcare to clients of all ages in the community, DH, PHC, CHC, SC/HWC and develop beginning skills in participating in all the National Health Programs.

COMPETENCIES: On completion of the course, the students will be able to

1. Explore the evolution of public health in India and community health nursing
2. Explain the concepts and determinants of health
3. Identify the levels of prevention and health problems of India
4. Develop basic understanding about the health care planning and the present health care delivery system in India at various levels
5. Locate the significance of primary health care and comprehensive primary health care as part of current health care delivery system focus
6. Discuss health care policies and regulations in India
7. Demonstrate understanding about an overview of environmental science, environmental health and sanitation
8. Demonstrate skill in nutritional assessment for different age groups in the community and provide appropriate nutritional counseling
9. Provide health education to individuals and families applying the principles and techniques of behavior change appropriate to community settings

10. Describe community health nursing approaches and concepts
11. Describe the role and responsibilities of community health nursing personnel
12. Utilize the knowledge and skills in providing comprehensive primary health care across the life span at various settings
13. Make effective home visits applying principles and methods used for home visiting
14. Use epidemiological approach in community diagnosis
15. Utilize the knowledge of epidemiology, epidemiological approaches in caring for people with communicable and non- communicable diseases
16. Investigate an epidemic of communicable diseases
17. Assess, diagnose, manage and refer clients for various communicable and non- communicable diseases appropriately at the primary health care level
18. Identify and perform the roles and responsibilities of nurses in implementing various national health programs in the community for the prevention, control and management of communicable and non-communicable diseases particularly in screening, identification, primary management and referral to a health facility/First Referral Unit (FRU)

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4 (T)	Define public health, community health and community health nursing Explain the evolution of public health in India and scope of community health nursing Explain various concepts of health and disease, dimensions and determinants of health Explain the natural history of disease and levels of prevention Discuss the health problems of India	**Concepts of Community Health and Community Health Nursing** • Definition of public health, community health and community health nursing • Public health in India and its evolution and Scope of community health nursing • *Review:* Concepts of Health & Illness/ disease: Definition, dimensions and determinants of health and disease • Natural history of disease Levels of prevention: Primary, Secondary & tertiary prevention – Review • Health problems (Profile) of India	• Lecture • Discussion • Explain using chart, graphs • Community needs assessment (Field survey on identification of demographic characteristics, health determinants and resources of a rural and an urban community) • Explain using examples	• Short answer • Essay • Objective type • Survey report
II	8 (T)	Describe health planning and its steps, and various health plans, and committees	**Health Care Planning and Organization of Health Care at various levels** • Health planning steps • Health planning in India: various committees and commissions on health and family welfare and Five-Year plans	• Lecture • Discussion • Field visits to CHC, PHC, SC/ Health Wellness Centers (HWC)	• Short answer • Essay Evaluation of Field visit reports & presentation

		Discuss health care delivery system in India at various levels Describe SDGs, primary health care and comprehensive primary health care (CPHC) Explain health care policies and regulations in India	• Participation of community and stakeholders in health planning • Health care delivery system in India: Infrastructure and Health sectors, Delivery of health services at sub-centre (SC), PHC, CHC, District level, state level and national level • Sustainable development goals (SDGs), Primary Health Care and Comprehensive Primary Health Care (CPHC): elements, principles • CPHC through SC/Health Wellness Center (HWC) • Role of MLHP/CHP • National Health Care Policies and Regulations ○ National Health Policy (1983, 2002, 2017) ○ National Health Mission (NHM): National Rural Health Mission (NRHM), National Urban Health Mission (NUHM), NHM ○ National Health Protection Mission (NHPM) ○ Ayushman Bharat ○ Universal Health Coverage	• Directed reading	

III	15 (T)	Identify the role of an individual in the conservation of natural resources Describe ecosystem, its structure, types and functions	**Environmental Science, Environmental Health, and Sanitation** • *Natural resources:* Renewable and non-renewable resources, natural resources and associated problems: Forest resources, water resources, mineral resources, food resources, energy resources and land resources • Role of individuals in conservation of natural resources, and equitable use of resources for sustainable lifestyles • *Ecosystem:* Concept, structure and functions of ecosystems, Types & Characteristics – Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem, Energy flow in ecosystem	• Lecture Discussion • Debates on environmental protection and preservation • Explain using Charts, graphs, Models, films, slides	• Short answer • Essay • Field visit reports

		Explain the classification, value and threats to biodiversity Enumerate the causes, effects and control measures of environmental pollution Discuss about climate change, global warming, acid rain, and ozone layer depletion Enumerate the role of an individual in creating awareness about the social issues related to environment List the Acts related to environmental protection and preservation Describe the concept of environmental health and sanitation	• *Biodiversity:* Classification, value of bio-diversity, threats to biodiversity, conservation of biodiversity • *Environmental pollution:* Introduction, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards & their impact on health • *Climate change, global warming:* ex. heat wave, acid rain, ozone layer depletion, waste land reclamation & its impact on health • *Social issues and environment:* sustainable development, urban problems related to energy, water and environmental ethics • Acts related to environmental protection and preservation **Environmental Health & Sanitation** • Concept of environment health and sanitation • Concept of safe water, sources of water, waterborne diseases, water purification processes, household purification of water	• Directed reading • Visits to water supply Observe rain water harvesting plants • & purification sites • Observe rain water harvesting plants	

		Describe water conservation, rain water harvesting and water shed management Explain waste management	• Concepts of water conservation: rain water harvesting and water shed management • Solid waste management, human excreta disposal & management and sewage disposal and management • Commonly used insecticides and pesticides	Visit to sewage disposal and treatment sites, and waste disposal sites	
IV	7 (T)	Describe the various nutrition assessment methods at the community level Plan and provide diet plans for all age groups including therapeutic diet Provide nutrition counseling and education to all age groups and describe the national nutrition programs	**Nutrition Assessment and Nutrition Education** • *Review of Nutrition* • Concepts, types • Meal planning: aims, steps & diet plan for different age groups • Nutrition assessment of individuals, families and community by using appropriate methods • Planning suitable diet for individuals and families according to local availability of foods, dietary habits and economic status • General nutritional advice • Nutrition education: purpose, principles & methods and Rehabilitation	• Lecture • Discussion • Demonstration • Role play • Market visit • Nutritional assessment for different age groups • Lecture • Discussion	Performance assessment of nutrition assessment for different age groups Evaluation on nutritional assessment reports • Short answer • Essay

		Identify early the food borne diseases, and perform initial management and referral appropriately	• *Review:* Nutritional deficiency disorders • National nutritional policy • & programs in India **Food Borne Diseases and Food Safety** **Food borne diseases** • Definition, & burden, Causes and classification • Signs & Symptoms • Transmission of food borne pathogens & toxins • Early identification, initial management and referral **Food poisoning & food intoxication** • Epidemiological features/clinical characteristics, Types of food poisoning • Food intoxication-features, preventive & control measures • Public health response to food borne diseases	• Field visits to milk purification plants, slaughterhouse • Refer Nutrition module-BPCCHN Block 2-unit I & UNIT 5	• Field visit reports

VI	7 (T)	Describe behaviour change communication skills Counsel and provide health education to individuals, families and community for promotion of healthy life style practices using appropriate methods and media	**Communication management and Health Education** ○ Behaviour change communication skills • communication ○ Human behaviour ○ Health belief model: concepts & definition, ways to influence behaviour ○ Steps of behaviour change ○ Techniques of behaviour change: Guiding principles in planning BCC activity ○ Steps of BCC ○ Social and Behaviour Change Communication strategies (SBCC): techniques to collect social history from clients ○ Barriers to effective ○ communication, and methods to overcome them ○ Health promotion and Health education: methods/techniques, and audio-visual aids	○ Lecture ○ Discussion ○ Role play ○ Demonstration: BCC skills ○ Supervised field practice ○ Refer: BCC/SBCC module (MoHFW & USAID)	• Short answer • Essay Performance evaluation of health education sessions to individuals and families
VI	7 (T)	Describe community health nursing approaches and concepts	**Community health nursing approaches, concepts, roles and responsibilities of community health nursing personnel** **Approaches:** • Nursing process • Epidemiological approach • Problem solving approach • Evidence based approach • Empowering people to care for themselves • *Review:* Primary health care and Comprehensive Primary Health Care (CPHC)	• Lecture • Discussion • Demonstration • Role plays	• Short answer • Essays

		Describe and identify the activities of community health nurse to promote and maintain family health through home visits	**Home Visits**: • Concept, Principles, Process, & Techniques: Bag technique • Qualities of Community HealthNurse • Roles and responsibilities of community health nursing personnel in family health services • *Review:* Principles & techniques of counseling	• Supervised field practice	• Assessment of supervised field practice
VII	10 (T)	Explain the specific activities of community health nurse in assisting individuals and groups to promote and maintain their health	**Assisting individuals and families to promote and maintain their health** ○ *Assessment of individuals and families* (Review from Child health nursing, Medical surgical nursing and OBG Nursing) • Assessment of children, women, adolescents, elderly etc. • Children: Monitoring growth and development, milestones • Anthropometric measurements, BMI • Social development • Temperature and Blood pressure monitoring • Menstrual cycle • Breast self-examination (BSE) and testicles self-examination (TSE) • Warning Signs of various diseases • Tests: Urine for sugar and albumin, blood sugar, Hemoglobin	• Lecture • Discussion • Demonstration • Role plays	• Short answer • Essay • Assessment of clinical performance in the field practice area • Assessment of procedural skills in lab procedures

		Provide primary care at home/ health centers (HWC) using standing orders/ protocols as per public health standards/approved by MoH&FW and INC regulation	*B. Provision of health services/primary health care:*
			• Routine check-up, Immunization, counseling, and diagnosis
			• Management of common diseases at home and health centre level
			  ○ Care based on standing orders/protocols approved by MoH&FW
			  ○ Drugs dispensing and injections at health centre
			C. Continue medical care and follow up in community for various diseases/disabilities
			D. Carry out therapeutic procedures as prescribed/required for client and family
			E. Maintenance of health records and reports
			• Maintenance of client records
			• Maintenance of health records at the facility level
			• Report writing and documentation of activities carried out during home visits, in the clinics/centers and field visits
					• Evaluation of records and reorts

		Develop beginning skills in handling social issues affecting the health and development of the family Identify and assist the families to utilize the community resources appropriately	• F. Sensitize and handle social issues affecting health and development of the family • Women empowerment • Women and child abuse • Abuse of elders • Female feticide • Commercial sex workers • Substance abuse • Utilize community resources for client and family • Trauma services • Old age homes • Orphanages • Homes for physically challenged individuals • Homes for destitute • Palliative care centres • Hospice care centres • Assisted living facility	• Family records • Health center records • Field visits	• Evaluation of field visit reports
VIII	10 (T)	Describe the concepts, approaches and methods of epidemiology	**Introduction to Epidemiology – Epidemiological Approaches and Processes** • Epidemiology: Concept and Definition • Distribution and frequency of disease • Aims & uses of epidemiology • Epidemiological models of causation of disease • Concepts of disease transmission • Modes of transmission: Direct, Indirect and chain of infection • Time trends or fluctuations in disease occurrence • Epidemiological approaches: Descriptive, analytical and experimental Principles of control measures/levels of prevention of disease	• Lecture • Discussion • Demonstration • Role play • Field visits: communicable disease hospital & Entomology office	• Short answer • Essay • Report on visit to communicable disease hospital • Report on visit to entomology office

		Investigate an epidemic of communicable disease	• Investigation of an epidemic of communicable disease • Use of basic epidemiological tools to make community diagnosis for effective planning and intervention	• Investigation of an epidemic of communicable disease	• Report and presentation on investigating an epidemic of communicable disease
IX	15 (T)	Explain the epidemiology of specific communicable diseases Describe the various methods of prevention, control and management of communicable diseases and the role of nurses in screening, diagnosing, primary management and referral to a health facility	**Communicable Diseases and National Health Programs** ○ *Communicable Diseases – Vector borne diseases (Every disease will be dealt under the following headlines)* • Epidemiology of the following vector born diseases • Prevention & control measures • Screening, and diagnosing the following conditions, primary management, referral and follow up • Malaria • Filaria • Kala-azar • Japanese encephalitis • Dengue • Chickungunya ○ *Communicable diseases: Infectious diseases (Every disease will be dealt under the following headlines)* • Epidemiology of the following infectious diseases • Prevention & Control measures • Screening, diagnosing the following conditions, primary management, referral and follow up • Leprosy • Tuberculosis • Vaccine preventable diseases – Diphtheria, whooping cough, tetanus, poliomyelitis and measles	• Lecture • Discussion, • Demonstration • Role play • Suggested field visits • Field practice • Assessment of clients with communicable diseases	• Field visit reports • Assessment of family case study • OSCE assessment • Short answer • Essay

			oEnteric fever oViral hepatitis HIV/AIDS/RTI infections HIV/AIDS, and Sexually Transmitted Diseases/ Reproductive tract infections (STIs/RTIs) Diarrhoea Respiratory tract infections COVID-19 Helminthic – soil & food transmitted and parasitic infections – Scabies and pediculosis **3**. *Communicable diseases: Zoonotic diseases* Epidemiology of Zoonotic diseases Prevention & control measures Screening and diagnosing the following conditions, primary management, referral and follow up oRabies: Identify, suspect, primary management and referral to a health facility Role of a nurses in control of communicable diseases **National Health Programs**		
		Identify the national health programs relevant to communicable diseases and explain the role of nurses in implementation of these programs	UIP: Universal Immunization Program (Diphtheria, Whooping cough, Tetanus, Poliomyelitis, Measles and Hepatitis B) National Leprosy Eradication Program (NLEP) 1. Revised National Tuberculosis Control Program (RNTCP) Integrated Disease Surveillance Program (IDSP): Enteric fever, Diarrhea, Respiratory infections and Scabies		

			• National Aids Control Organization (NACO) • National Vector Borne Disease Control Program • National Air Quality Monitoring Program • Any other newly added program		
X	15 (T)	Describe the national health program for the control of non-communicable diseases and the role of nurses in screening, identification, primary management and referral to a health facility	**Non-Communicable Diseases and National Health Program (NCD)** National response to NCDs (Every disease will be dealt under the following headlines Epidemiology of specific diseases Prevention and control measures Screening, diagnosing/ identification and primary management, referral and follow up care **NCD-1** Diabetes Mellitus Hypertension Cardiovascular diseases Stroke & Obesity **Blindness**: Categories of visual impairment and national program for control of blindness **Deafness:** national program for prevention and control of deafness **Thyroid diseases** **Injury and accidents:** Risk factors for Road traffic injuries and operational guidelines for trauma care facility on highways **NCD-2 Cancers** ○ cervical Cancer o Breast Cancer ○ Oral cancer Epidemiology of specific cancers, Risk factors/ Causes, Prevention, Screening, diagnosis – signs, Signs & symptoms, and early management & referral Palliative care Role of a nurse in non-communicable disease control program	○ Lecture ○ Discussion ○ Demonstration ○ Role play ○ Suggested field visits ○ Field practice ○ Assessment of clients with non-communicable diseases	○ Field visit reports ○ Assessment of family case study ○ OSCE assessment ○ Short answer ○ Essay

			National Health Programs • National program for prevention and control of cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) • National program for control of blindness • National program for prevention and control of deafness • National tobacco control program • **Standard treatment protocols used in National Health Programs**	Participation in national health programs	
XI	3 (T)	Enumerate the school health activities and the role functions of a school health nurse	**School Health Services** • Objectives • Health problems of school children • Components of school health services • Maintenance of school health records • Initiation and planning of school health services • Role of a school health nurse	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	○ Short answer ○ Essay ○ Evaluation of health counseling to school children ○ Screen, diagnose, manage and refer school children ○ OSCE assessment

Note: Lab hours less than 1 Credit is not specified separately.

CLINICAL PRACTICUM

CLINICAL: 2 Credits (160 hours)

CLINICAL POSTINGS: (4 weeks × 40 hours per week)

Clinical Area/Unit	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Urban	2 weeks	Build and maintain rapport	• Interviewing skills using communication and interpersonal relationship	• Community needs assessment/ Survey – Rural/urban – 1	• Evaluation of survey report
Rural	2 Weeks	Identify the socio-demographic characteristics, health determinants and resources of a rural and an urban community	Conducting community needs assessment/survey to identify health determinants of a community	Field visits: SC/HWC, PHC, CHC Water resources & purification site – water quality standards Rain water harvesting Sewage disposal Observation of milk diary slaughterhouse – meat hygiene	Evaluation of field visit and observation reports
		Observe the functioning and document significant observations	Observation skills	Observation of nutrition programs Visit to market	
		Perform nutritional assessment and plan diet plan for adult	Nutritional assessment skills	Nutritional assessment of an individual (adult) – 1 Health teaching (Adult) – 1 Use of audio-visual aids Flash cards Posters Flannel graph Flip charts	
		Educate individuals/ family/community on Nutrition Hygiene Food hygiene Healthy lifestyle Health promotion	Skill in teaching individual/family on: Nutrition, including food hygiene and safety Healthy lifestyle Health promotion	Health assessment of woman – 1, infant/under five – 1, adolescent – 1, adult – 1 Growth monitoring of under-five children – 1	Health talk evaluation
		Perform health assessment for clients of various age groups	Health assessment including nutritional assessment for clients of different age groups	**Document and maintain**: Individual record Family record Health center record Community health survey to investigate an epidemic – 1	Assessment of clinical performance ○ Evaluations of reports & records
			Documentation skills		

		○ Investigate epidemic of communicable disease ○ Identify prevalent communicable and non-communicable diseases ○ Screen, diagnose, manage and refer clients with common health problems in the community and refer high risk clients using standing orders/protocols ○ Participate in implementation of national health programs ○ Participate in school health program	○ Investigating an epidemic – Community health survey ○ Screening, diagnosing, primary management of common health problems in the community and referral of high-risk clients to FRUs ○ Conduct home visit ○ Participation in implementation of national health programs ○ Participation in school health program	○ **Screening, diagnosing and primary management and referral**: ○ Communicable disease – 1 ○ Non-communicable diseases – 1 ○ Home visits – 2 ○ Participation in any two national health programs ○ Participation in school health program – 1	○ Clinical performance assessment ○ OSCE ○ Final clinical examination ○ Evaluation of home visit

EDUCATIONAL TECHNOLOGY/NURSING EDUCATION

PLACEMENT: V SEMESTER
THEORY: 2 Credits (40 hours)

PRACTICUM: Lab/Practical: 1 Credit (40 hours)

COURSE CODE: EDUC 315

COURSE DESCRIPTION: This course is designed to help the students to develop knowledge, attitude and beginning competencies essential for applying basic principles of teaching and learning among individuals and groups both in educational and clinical settings. It also introduces basics of curriculum planning and organization. It further enables students to participate actively in team and collaborative learning.

COMPETENCIES: On completion of the course, the students will be competent to

1. Develop basic understanding of theoretical foundations and principles of teaching and learning
2. Identify the latest approaches to education and learning
3. Initiate self- assessment to identify one's own learning styles
4. Demonstrate understanding of various teaching styles that can be used, based on the learners 'readiness and generational needs
5. Develop understanding of basics of curriculum planning, and organizing
6. Analyze and use different teaching methods effectively that are relevant to student population and settings
7. Make appropriate decisions in selection of teaching learning activities integrating basic principles
8. Utilize active learning strategies that enhance critical thinking, team learning and collaboration
9. Engage in team learning and collaboration through inter professional education
10. Integrate the principles of teaching and learning in selection and use of educational media/technology
11. Apply the principles of assessment in selection and use of assessment and evaluation strategies
12. Construct simple assessment tools/tests integrating cognitive, psychomotor and affective domains of learning that can measure knowledge and competence of students
13. Develop basic understanding of student guidance through mentoring and academic advising
14. Identify difficult situations, crisis and disciplinary/grievance issues experienced by students and provide appropriate counseling
15. Engage in ethical practice in educational as well as clinical settings based on values, principles and ethical standards
16. Develop basic understanding of evidence-based teaching practice

COURSE OUTLINE

T – Theory, P – Practical (Laboratory)

Unit	Time (Hrs.)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	6	3	• Explain the definition, aims, types, approaches and scope of educational technology • Compare and contrast the various educational philosophies • Explain the teaching learning process, nature, characteristics and principles	**Introduction and Theoretical Foundations:** • *Education and educational technology* • Definition, aims • Approaches and scope of educational technology • Latest approaches to education: o Transformational education oRelationship based education oCompetency based education • *Educational philosophy:* • Definition of philosophy, education and philosophy • Comparison of educational philosophies • Philosophy of nursing education • *Teaching learning process:* • Definitions • Teaching learning as a process • Nature and characteristics of teaching and learning • Principles of teaching and learning • Barriers to teaching and learning • Learning theories • Latest approaches to learning • oExperiential learning	• Lecture cum discussion	• Quiz

				• Reflective learning • Scenario based learning • Simulation based learning • Blended learning	**Group exercise**: Create/discuss scenario-based exercise	**Assessment of Assignment:** Learning theories – analysis of any one
II	6	6	Identify essential qualities/attributes of a teacher Describe the teaching styles of faculty Explain the determinants of learning and initiates self-assessment to identify own learning style Identify the factors that motivate the learner Define curriculum and classify types Identify the factors influencing curriculum development Develop skill in writing learning outcomes, and lesson plan	**Assessment and Planning** ***Assessment of teacher*** • Essential qualities of a teacher • Teaching styles – Formal authority, demonstrator, facilitator, delegator *Assessment of learner* • Types of learners • Determinants of learning – learning needs, readiness to learn, learning styles • Today's generation of learners and their skills and attributes • Emotional intelligence of the learner • Motivational factors – personal factors, environmental factors and support system • Curriculum Planning • Curriculum – definition, types • Curriculum design – components, approaches • Curriculum development – factors influencing curriculum development, facilitators and barriers • Writing learning outcomes/ behavioral objectives • Basic principles of writing course plan, unit plan and lesson plan	Lecture cum discussion Self-assessment exercise: Identify your learning style using any learning style inventory (ex. Kolb's learning style inventory) Lecture cum discussion Individual/group exercise: Writing learning outcomes Preparation of a lesson plan	Short answer Objective type Assessment of Assignment: Individual/ Group
III	8	15	Explain the principles and strategies of classroom management	**Implementation** *Teaching in Classroom and Skill lab* – • *Teaching Methods* • Classroom management-principles and strategies • Classroom communication • oFacilitators and Barriers to classroom communication	• Lecture cum Discussion	• Short answer • Objective type

			Describe different methods/strategies of teaching and develop beginning skill in using various teaching methods Explain active learning strategies and participate actively in team and collaborative learning	oInformation communication technology (ICT) – ICT used in education *Teaching methods – Features, advantages and disadvantages* Lecture, Group discussion, microteaching Skill lab – simulations, Demonstration & re-demonstration Symposium, panel discussion, seminar, scientific workshop, exhibitions Role play, project Field trips Self-directed learning (SDL) Computer assisted learning One-to-one instruction *Active learning strategies* Team based learning Problem based learning Peer sharing Case study analysis Journaling Debate Gaming Inter-professional education	Practice teaching/Micro teaching Exercise (Peer teaching) Patient teaching session Construction of game – puzzle Teaching in groups – interdisciplinary	Assessment of microteaching
IV	3	3	Enumerate the factors influencing selection of clinical learning experiences Develop skill in using different clinical teaching strategies	**Teaching in the Clinical Setting – Teaching Methods** • Clinical learning environment • Factors influencing selection of clinical learning experiences • Practice model • Characteristics of effective clinical teacher • Writing clinical learning outcomes/practice competencies • Clinical teaching strategies – patient assignment – clinical conference, clinical presentation/bedside clinic, Case study/care study, nursing rounds, concept mapping, project, debate, game, role play, PBL, questioning, written assignment, process recording	• Lecture cum discussion Writing clinical outcomes – assignments in pairs	• Short answer Assessment of written assignment

V	5	5	Explain the purpose, principles and steps in the use of media Categorize the different types of media and describe its advantages and disadvantages Develop skill in preparing and using media	**Educational/Teaching Media** • Media use – Purpose, components, principles and steps • Types of media *Still visuals* o Non projected – drawings & diagrams, charts, graphs, posters, cartoons, board devices (chalk/white board, bulletin board, flannel board, flip charts, flash cards, still pictures/photographs, printed materials-handout, leaflet, brochure, flyer o Projected – film stripes, microscope, power point slides, overhead projector *Moving visuals* o Video learning resources – videotapes & DVD, blu-ray, USB flash drive o Motion pictures/films *Realia and models* o Real objects & Models *Audio aids/audio media* o Audiotapes/Compact discs o Radio & Tape o recorder oPublic o address system o Digital audio *Electronic media/computer learning resources* o Computers o Web-based videoconferencing o E-learning, Smart classroom *Telecommunication (Distance education)* o Cable TV, satellite broadcasting, videoconferencing Telephones – Telehealth/telenursing *Mobile technology*	• Lecture cum discussion • Preparation of different teaching aids – (Integrate with practice teaching sessions)	• Short answer • Objective type • Assessment of the teaching media prepared

VI	5	3	Describe the purpose, scope, principles in selection of evaluation methods and barriers to evaluation Explain the guidelines to develop assessment tests Develop skill in construction of different tests Identify various clinical evaluation tools and demonstrate skill in selected tests	**Assessment/Evaluation Methods/Strategies** • Purposes, scope and principles in selection of assessment methods and types • Barriers to evaluation Guidelines to develop assessment tests *Assessment of knowledge*: • Essay type questions, • Short answer questions (SAQ) • Multiple choice questions (MCQ – single response & multiple response) *Assessment of skills:* • Clinical evaluation • Observation (checklist, rating scales, videotapes) • Written communication – progress notes, nursing care plans, process recording, written assignments • Verbal communication (oral examination) • Simulation • Objective Structured Clinical Examination (OSCE) • Self-evaluation • Clinical portfolio, clinical logs *Assessment of Attitude:* • Attitude scales *Assessment tests for higher learning*: • Interpretive questions, hot spot questions, drag and drop and ordered response questions	• Lecture cum discussion Exercise on constructing assessment tool/s	• Short answer • Objective type Assessment of tool/s prepared

VII	3	3	Explain the scope, purpose and principles of guidance Differentiate between guidance and counseling Describe the principles, types, and counseling process Develop basic skill of counseling and guidance Recognize the importance of preventive counseling and develop skill to respond to disciplinary problems and grievance among students	**Guidance/academic advising, counseling and discipline** *Guidance* Definition, objectives, scope, purpose and principles Roles of academic advisor/ faculty in guidance *Counseling* Difference between guidance and counseling Definition, objectives, scope, principles, types, process and steps of counseling Counseling skills/techniques – basics Roles of counselor Organization of counseling services Issues for counseling in nursing students *Discipline and grievance in students* Managing disciplinary/grievance problems – preventive guidance & counseling Role of students'grievance redressal cell/committee	Lecture cum discussion Role play on student counseling in different situations Assignment on identifying situations requiring counseling	Assessment of performance in role play scenario Evaluation of assignment
VIII	4	2	Recognize the importance of value- based education Develop skill in ethical decision making and maintain ethical standards for students Introduce knowledge of EBT and its application in nursing education	**Ethics and Evidence Based Teaching (EBT) in Nursing Education** *Ethics – Review* • Definition of terms • Value based education in nursing • Value development strategies • Ethical decision making • Ethical standards for students • Student-faculty relationship *Evidence based teaching – Introduction* • Evidence based education process and its application to nursing education	• Value clarification exercise • Case study analysis (student encountered scenarios) and suggest ethical decision-making steps • Lecture cum discussion	• Short answer • Evaluation of case study analysis • Quiz – MCQ

INTRODUCTION TO FORENSIC NURSING AND INDIAN LAWS

PLACEMENT: V SEMESTER

THEORY: 1 Credit (20 hours)
COURSE CODE: N-FORN-320

COURSE DESCRIPTION: This course is designed to help students to know the importance of forensic science in total patient care and to recognize forensic nursing as a specialty discipline in professional nursing practice.

COMPETENCIES: On completion of the course, the students will be able to

1. Identify forensic nursing as an emerging specialty in healthcare and nursing practice
2. Explore the history and scope of forensic nursing practice
3. Identify forensic team, role and responsibilities of forensic nurse in total care of victim of violence and in preservation of evidence
4. Develop basic understanding of the Indian judicial system and legal procedure

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	3 (T)	Describe the nature of forensic science and discus issues concerning violence	**Forensic Science** • Definition • History • Importance in medical science • Forensic Science Laboratory **Violence** • Definition • Epidemiology • Source of data	• Lecture cum discussion • Visit to Regional Forensic Science Laboratory	• Quiz – MCQ • Write visit report
II	2 (T)	Explain concepts of forensic nursing and scope of practice for forensic nurse	**Forensic Nursing** • Definition • History and development • Scope – setting of practice, areas of practice and subspecialties • Ethical issues • Roles and responsibilities of nurse • INC & SNC Acts	• Lecture cum discussion	• Short answer • Objective type
III	7 (T)	Identify members of forensic team and describe role of forensic nurse	**Forensic Team** • Members and their roles **Comprehensive forensic nursing care of victim and family** • Physical aspects • Psychosocial aspects • Cultural and spiritual aspects • Legal aspects • Assist forensic team in care beyond scope of her practice • Admission and discharge/referral/death of victim of violence • Responsibilities of nurse as a witness **Evidence preservation – role of nurses** • Observation • Recognition	• Lecture cum Discussion • Hypothetical/ • real case presentation • Observation of post- mortem • Visit to department of forensic medicine	• Objective type • Short answer • Write report

			• Collection • Preservation • Documentation of Biological and other evidence related to criminal/traumatic event • Forwarding biological samples for forensic examination		
IV	3 (T)	Describe fundamental rights and human rights commission	**Introduction of Indian Constitution** **Fundamental Rights** • Rights of victim • Rights of accused **Human Rights Commission**	• Lecture cum discussion • Written Assignment • Visit to prison	• Short answer • Assessment of written assignment • Write visit report
V	5 (T)	Explain Indian judicial system and laws Discuss the importance of POSCO Act	**Sources of laws and law-making powers** **Overview of Indian Judicial System** • JMFC (Judicial Magistrate First Class) • District • State • Apex **Civil and Criminal Case Procedures** • IPC (Indian Penal Code) • ICPC • IE Act (Indian Evidence Act) **Overview of POSCO Act**	• Lecture cum discussion • Guided reading • Lecture cum discussion	• Quiz • Short answer

SYLLABUS

VI SEMESTER

B.Sc. NURSING

CHILD HEALTH NURSING - II

PLACEMENT: VI SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICUM: Clinical: 1 Credit (80 hours)

COURSE CODE: N CHN(II) 301

COURSE DESCRIPTION: This course is designed for developing an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply the knowledge of pathophysiology and provide nursing care to children with Cardiovascular, GI, genitourinary, nervous system disorders, orthopedic disorders, eye, ear and skin disorders and communicable diseases
2. Provide care to children with common behavioral, social and psychiatric problems
3. Manage challenged children
4. Identify the social and welfare services for challenged children

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	20 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with disorders of cardiovascular, gastrointestinal, genitourinary, and nervous system	**Cardiovascular system:** • Identification and Nursing management of congenital malformations • Congenital heart diseases: Cyanotic and Acyanotic (ASD, VSD, PDA,TOF) • Others: Rheumatic fever and Rheumatic heart disease, Congestive cardiac failure • Hematological condition02s: • Congenital: Hemophilia, • Thalassemia • Others: Anemia, Leukemia, Idiopathic thrombocytopenic purpura, Hodgkin's and non-Hodgkin lymphoma • **Gastro-intestinal system:** • Identification and Nursing management of congenital malformations. • Congenital: Cleft lip, Cleft palate, Congenital hypertrophic pyloric stenosis, Hirschsprungs disease (Megacolon), Anorectal malformation, Malabsorption syndrome, Abdominal wall defects, Hernia • Others: Gastroenteritis, Diarrhea, Vomiting, Protein energy malnutrition, Intestinal obstruction, Hepatic diseases, intestinal parasites • **Genitourinary urinary system:** • Identification and Nursing management of congenital malformations. • Congenital: Wilms tumor, Extropy of bladder, Hypospadias, Epispadias, Obstructive uropathy • Others: Nephrotic syndrome, Acute glomerulonephritis, renal failure • **Nervous system:** • Identification and Nursing management of congenital malformations • Congenital: Spina bifida, Hydrocephalous. • Others: Meningitis, Encephalitis, Convulsive disorders (convulsions and seizures), Cerebral palsy head injury	• Lecture cum discussion • Demonstration and practice session • Refer/Consult SAM operational guidelines on facility-based management of children with severe acute malnutrition	• Short answer • Objective type • Assessment of skills with checklist

II	10 (T)	Describe the etiology, pathophysiology, clinical manifestation and nursing management of children with Orthopedic disorders, eye, ear and skin disorders Explain the preventive measures and strategies for children with communicable diseases	**Orthopedic disorders**: • Club foot • Hip dislocation and • Fracture • Disorder of eye, ear and skin: • Refractory errors • Otitis media and • Atopic dermatitis • Communicable diseases in children, their identification/ diagnosis, nursing management in hospital, in home, control • & prevention: • Tuberculosis • Diphtheria • Tetanus • Pertussis • Poliomyelitis • Measles • Mumps, and • Chickenpox • HIV/AIDS • Dengue fever • COVID-19	• Lecture cum discussion • Demonstration • Practice session • Clinical practice	• Short answer • Objective type • Assessment of skills with checklist
III	10 (T)	Describe the management of children with behavioral & social problems Identify the social & welfare services for challenged children	**Management of behavior and social problems in children** • Child Guidance clinic • Common behavior disorders in children and management ○ Enuresis and Encopresis ○ Nervousness ○ Nail biting ○ Thumb sucking ○ Temper tantrum ○ Stealing ○ Aggressiveness ○ Juvenile delinquency ○ School phobia ○ Learning disability	• Lecture cum discussion • Field visits to child guidance clinics, school for mentally • & physically, socially challenged	• Short answer • Objective type • Assessment of field reports

			• **Psychiatric disorders in children and management** ○ Childhood schizophrenia ○ Childhood depression ○ Conversion reaction ○ Posttraumatic stress disorder ○ Autistic spectrum disorders ○ Eating disorder in children and management ○ Obesity ○ Anorexia nervosa ○ Bulimia ○ Management of challenged children. ○ Mentally ○ Physically ○ Socially ○ Child abuse, ○ Substance abuse ○ Welfare services for challenged children in India		

CHILD HEALTH NURSING - II – CLINICAL PRACTICUM (1 Credit – 80 hours)

Given under Child Health Nursing - I as I & II

MENTAL HEALTH NURSING – II

PLACEMENT: VI SEMESTER

THEORY: 1 Credit (40 Hours)

PRACTICUM: Clinical: 2 Credits (160 Hours)

COURSE CODE: N-MHN(II)-305

COURSE DESCRIPTION: This course is designed to provide the students with basic understanding and skills essential to meet psychiatric emergencies and perform the role of community mental health nurse.

COMPETENCIES: On completion of the course, the students will be able to

1. Apply nursing process in providing care to patients with substance use disorders, and personality and sexual disorders.
2. Apply nursing process in providing care to patients with behavioral and emotional disorders occurring during childhood and adolescence.
3. Apply nursing process in providing care to patients with organic brain disorders.
4. Identify and respond to psychiatric emergencies.
5. Carry out crisis interventions during emergencies under supervision.
6. Perform admission and discharge procedures as per MHCA 2017.
7. Explore the roles and responsibilities of community mental health nurse in delivering community mental health services.

COURSE OUTLINE
T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with substance use disorders	**Nursing Management of Patients with Substance Use Disorders** • Prevalence and incidence • Commonly used psychotropic substance: classifications, forms, routes, action, intoxication and withdrawal • Psychodynamics/etiology of substance use disorder (Terminologies: Substance Use, Abuse, Tolerance, Dependence, Withdrawal) • Diagnostic criteria/formulations • Nursing Assessment: History (substance history), Physical, mental assessment and drug and drug assay • Treatment (detoxification, Antabuse and narcotic antagonist therapy and harm reduction, Brief interventions, MET, refusal skills, maintenance therapy) and nursing management of patients with substance use disorders • Special considerations for vulnerable population • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
II	6 (T)	Describe the etiology, psycho-dynamics, clinical manifestations, diagnostic criteria and management of patients with personality, and sexual disorders	**Nursing Management of Patient with Personality and Sexual Disorders** • Prevalence and incidence • Classification of disorders • Etiology, psychopathology, characteristics, diagnosis • Nursing Assessment: History, Physical and mental health assessment • Treatment modalities and nursing management of patients with personality, and sexual disorders • Geriatric considerations • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems

III	8 (T)	• Describe the etiology, psycho-pathology, clinical manifestations, diagnostic criteria and management of childhood and adolescent disorders including mental deficiency	**Nursing Management of Behavioral & Emotional Disorders occurring during Childhood and Adolescence** • **(**Intellectual disability, autism, attention deficit, hyperactive disorder, eating disorders, learning disorder) • Prevalence and incidence • Classifications • Etiology, psychodynamics, Characteristics, diagnostic criteria/formulations • Nursing Assessment: History, Physical, mental status examination and IQ assessment • Treatment modalities and nursing management of childhood disorders including intellectual disability • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
IV	5 (T)	• Describe the etiology, psycho-pathology, clinical manifestations, diagnostic criteria and management of organic brain disorders.	**Nursing Management of Organic Brain Disorders** • (Delirium, Dementia, amnestic disorders) • Prevalence and incidence • Classification • Etiology, psychopathology, clinical features, diagnosis and Differential diagnosis • Nursing Assessment: History, Physical, mental and neurological assessment • Treatment modalities and nursing management of organic brain disorders • Follow-up and home care and rehabilitation	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Essay • Short answer • Assessment of patient management problems
V	6 (T)	• Identify psychiatric emergencies and carry out crisis intervention	**Psychiatric Emergencies and Crisis Intervention** • Types of psychiatric emergencies (attempted suicide, violence/ aggression, stupor, delirium tremens and other psychiatric emergencies) and their managements • Maladaptive behaviour of individual and groups, stress, crisis and disaster(s) • Types of crisis • Crisis intervention: Principles, Techniques and Process • Stress reduction interventions as per stress adaptation model • Coping enhancement • Techniques of counseling	• Lecture cum discussion • Case discussion • Case presentation • Clinical practice	• Short answer • Objective type

VI	4 (T)	• Explain legal aspects applied in mental health settings and role of the nurse	**Legal Issues in Mental Health Nursing** • Overview of Indian Lunacy Act and The Mental Health Act 1987 • (Protection of Children from Sexual Offence) POSCO Act • Mental Health Care Act (MHCA) 2017 • Rights of mentally ill clients • Forensic psychiatry and nursing • Acts related to narcotic and psychotropic substances and illegal drug trafficking • Admission and discharge procedures as per MHCA 2017 • Role and responsibilities of nurses in implementing MHCA 2017	• Lecture cum discussion • Case discussion	• Short answer • Objective type
VII	5 (T)	• Describe the model of preventive psychiatry • Describe Community Mental health services and role of the nurse	**Community Mental Health Nursing** • Development of Community Mental Health Services: • National mental health policy viz. National Health Policy • National Mental Health Program • Institutionalization versus Deinstitutionalization • Model of Preventive psychiatry • Mental Health Services available at the primary, secondary, tertiary levels including rehabilitation and nurses 'responsibilities • Mental Health Agencies: Government and voluntary, National and International • Mental health nursing issues for special populations: Children, Adolescence, Women Elderly, Victims of violence and abuse, Handicapped, HIV/AIDS etc.	• Lecture cum discussion • Clinical/ field practice • Field visits to mental health service agencies	• Short answer • Objective type • Assessment of the field visit reports

CLINICAL PRACTICUM – 2 Credits (80 hours)

Clinical Practicum for Mental Health Nursing - I & II are given under Mental Health Nursing - I Clinical Practicum

NURSING MANAGEMENT AND LEADERSHIP

PLACEMENT: VI Semester

THEORY: 3 Credits (60 hours) includes Lab/Skill Lab hours also

PRACTICUM: Clinical: 1 Credits (80 hours)

COURSE CODE:

COURSE DESCRIPTION: This course is designed to enable students to acquire knowledge and competencies in areas of administration, and management of nursing services and education. Further prepares the students to develop leadership competencies and perform their role as effective leaders in an organization.

COMPETENCIES: On completion of the course, the students will be able to

1. Analyze the health care trends influencing development of nursing services and education in India.
2. Describe the principles, functions and process of management applied to nursing.
3. Develop basic understanding and beginning competencies in planning and organizing nursing services in a hospital.
4. Apply the concept of human resource management and identify the job description for all categories of nursing personnel including in service education.
5. Discuss the principles and methods of staffing and scheduling in an individual hospital/nursing unit.
6. Develop skill in management of materials and supplies including inventory control.
7. Develop team working and inter professional collaboration competencies.
8. Identify effective leadership styles and develop leadership competencies.
9. Utilize the knowledge of principles and line of control and participate in quality management and evaluation activities.
10. Utilize the knowledge related to financial planning in nursing services and education during budgetary process.
11. Apply the knowledge of nursing informatics in maintenance of records and reports relevant to patient information, nursing care and progress.
12. Demonstrate understanding of the INC guidelines for establishment and accreditation of educational institutions in terms of faculty norms, physical infrastructure and clinical facilities.
13. Demonstrate beginning competencies in planning, organizing and staffing at college including implementation and evaluation of curriculum.
14. Identify the legal issues and laws relevant to nursing practice and education.

15 Apply the knowledge and utilize the various opportunities for professional advancement.

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	1 (T)	Explore the health care, development of nursing services and education in India and trends	**Health Care and Development of Nursing Services in India** • Current health care delivery system of India – review • Planning and development of nursing services and education at global and national scenario • Recent trends and issues of nursing service and management	• Lecture cum discussion • Directed reading and written assignment	• Short answer • Assessment of assignment
II	2 (T)	Explain the principles and functions of management applied to nursing Describe the introductory concepts of management as a process	**Management Basics Applied to Nursing** • Definitions, concepts and theories of management • Importance, features and levels of management • Management and administration • Functions of management • Principles of management • Role of a nurse as a manager • **Introduction to Management Process** • Planning • Organizing • Staffing • Directing/Leading • Controlling	• Lecture and discussion	• MCQ • Short answer
			MANAGEMENT OF NURSING SERVICES		
III	4 (T)	Describe the essential elements of planning	**Planning Nursing Services** • Vision, Mission, philosophy, objectives • Nursing service policies, procedures and manuals • Functional and operational planning • Strategic planning • Program planning – Gantt chart & milestone chart • Budgeting – concepts, principles, types, • Budget proposal, cost benefit analysis • Planning hospital and patient care unit (Ward) • Planning for emergency and disaster	• Lecture and Discussion • Visit to specific hospital/ patient care units • Demonstration of disaster drill in the respective setting	• Formulate Mission & Vision Statement for the nursing department/ unit • Assessment

IV	4 (T)	Discuss the concepts of organizing including hospital organization	**Organizing** • Organizing as a process – assignment, delegation and coordination • Hospital – types, functions & organization • Organizational development • Organizational structure • Organizational charts • Organizational effectiveness • Hospital administration, Control & line of authority • Hospital statistics including hospital utilization indices • Nursing care delivery systems and trends	• Lecture cum discussion • Comparison of organizational structure of various organizations • Nursing care delivery systems – assignment • Preparation of Organizational chart of hospital/ Nursing services	• Short answer • Assessment of assignment
V	6 (T)	Identify the significance of human resource management (HRM) and material management and discuss its elements	**Staffing (Human resource management)** Definition, objectives, components and functions **Staffing & Scheduling** Staffing – Philosophy, staffing activities Recruiting, selecting, deployment Training, development, credentialing, retaining, promoting, transfer, terminating, superannuation Staffing units – Projecting staffing requirements/calculation of requirements of staff resources Nurse patient ratio, Nurse Population ratio as per SIU norms/IPH Norms, and Patient classification system Categories of nursing personnel including job description of all levels Assignment and nursing care responsibilities Turnover and absenteeism Staff welfare Discipline and grievances	• Lecture and discussion • Role play • Games self-assessment, case discussion and practice session • Calculation of staffing requirements for a specified ward	• Formulate Job description at different levels of care & compare with existing system • Preparation of duty roster

		Explain the procedural steps of material management Develop managerial skill in inventory control and actively participate in procurement process	**In-Service Education** • Nature and scope of in-service education program • Principles of adult learning – review • Planning and organizing in-service educational program • Methods, techniques and evaluation • Preparation of report **Material Resource Management** • Procurement, purchasing process, inventory control & role of nurse • Auditing and maintenance in hospital and patient care unit	Visit to inventory store of the institution	• Preparation of MMF/records • Preparation of log book & condemnation documents • Visit Report
VI	5 (T)	Describe the important methods of supervision and guidance	**Directing and Leading** • Definition, principles, elements of directing • Supervision and guidance • Participatory management • Inter-professional collaboration • Management by objectives • Team management • Assignments, rotations • Maintenance of discipline • Leadership in management	• Lecture and discussion • Demonstration of record & report maintenance in specific wards/ departments	• Assignment on Reports & Records maintained in nursing department/ • Preparation of protocols and manuals
VII	4 (T)	Discuss the significance and changing trends of nursing leadership Analyze the different leadership styles and develop leadership competencies	**Leadership** • Definition, concepts, and theories • Leadership principles and competencies • Leadership styles: Situational leadership, Transformational leadership • Methods of leadership development • Mentorship/preceptorship in nursing • Delegation, power & politics, empowerment, mentoring and coaching • Decision making and problem solving • Conflict management and negotiation • Implementing planned change	• Lecture cum discussion • Self-assessment • Report on types of leadership adopted at different levels of health care in the given setting • Problem solving/ Conflict management exercise • Observation of managerial roles at different levels (middle level mangers-ward in charge, ANS)	• Short answer • Essay • Assessment of exercise/report

VIII	4 (T)	Explain the process of controlling and its activities	**Controlling** • Implementing standards, policies, procedures, protocols and practices • Nursing performance audit, patient satisfaction • Nursing rounds, Documentation – records and reports • Total quality management – Quality assurance, Quality and safety • Performance appraisal • Program evaluation review technique (PERT) • Bench marking, Activity plan (Gantt chart) • Critical path analysis	• Lecture cum discussion • Preparation of policies/ protocols for nursing units/ department	• Assessment of prepared protocols
IX	4 (T)	Explain the concepts of organizational behavior and group dynamics	**Organizational Behavior and Human Relations** • Concepts and theories of organizational behavior • Group dynamics • Review – Interpersonal relationship • Human relations • Public relations in the context of nursing • Relations with professional associations and employee unions • Collective bargaining • Review – Motivation and morale building • Communication in the workplace – assertive communication • Committees – importance in the organization, functioning	• Lecture and discussion • Role play/ exercise – Group dynamics & human relations	• Short answer • OSCE

X	2 (T)	Describe the financial management related to nursing services	**Financial Management** • Definition, objectives, elements, functions, principles & scope of financial management • Financial planning (budgeting for nursing department) • Proposal, projecting requirement for staff, equipment and supplies for – Hospital & patient care units & emergency and disaster units Budget and Budgetary process Financial audit	• Lecture cum discussion • Budget proposal review • Preparation of budget proposal for a specific department	• Short answer • Essay • Assessment of assignment
XI	1 (T)	Review the concepts, principles and methods and use of nursing informatics	**Nursing Informatics/ Information Management – Review** • Patient records • Nursing records • Use of computers in hospital, college and community • Telemedicine & Tele nursing • Electronic Medical Records (EMR), EHR	• Review • Practice session • Visit to departments	• Short answer
XII	1 (T)	Review personal management in terms of management of emotions, stress and resilience	**Personal Management – Review** • Emotional intelligence • Resilience building • Stress and time management – de- stressing • Career planning	• Review • Discussion	
XIII	4 (T)	Describe the process of establishing educational institutions and its accreditation guidelines	**Establishment of Nursing Educational Institutions** • Indian Nursing Council norms and guidelines – Faculty norms, physical facilities, clinical facilities, curriculum implementation, and evaluation/examination guidelines • Coordination with regulatory bodies – INC and State Nursing Council • Accreditation – Inspections • Affiliation with university/State council/board of examinations	• Lecture and discussion • Visit to one of the regulatory bodies	• Visit report

XIV	4 (T)	Explain the planning and organizing functions of a nursing college	**Planning and Organizing** • Philosophy, objectives and mission of the college • Organization structure of school/college • Review – Curriculum planning • Planning teaching and learning experiences, clinical facilities – master plan, time table and clinical rotation • Budget planning – faculty, staff, equipment & supplies, AV aids, Lab equipment, library books, journals, computers and maintenance • Infrastructure facilities – college, classrooms, hostel, library, labs, computer lab, transport facilities • Records & reports for students, staff, faculty and administrative • Committees and functioning • Clinical experiences	• Directed reading – INC Curriculum • Preparation of organizational structure of the college • Written assignment – writing philosophy of a teaching department • Preparation of master plan, time table and clinical rotation	• Short answer • Essay • Assessment of assignment
XV	4 (T)	Develop understanding of staffing the college and selecting the students	**Staffing and Student Selection** Faculty/staff selection, recruitment and placement, job description Performance appraisal Faculty development Faculty/staff welfare Student recruitment, admission, clinical placement	Guided reading on faculty norms Faculty welfare activities report Writing job description of tutors	Short answer Activity report Assessment of job description
XVI	4 (T)	Analyze the leadership and management activities in an educational organization	**Directing and Controlling** • Review – Curriculum implementation and evaluation • Leadership and motivation, supervision – review • Guidance and counseling • Quality management – educational audit • Program evaluation, evaluation of performance • Maintaining discipline • Institutional records and reports – administrative, faculty, staff and students	• Review principles of evaluation • **Assignment –** Identify disciplinary problems among students • Writing student record	• Short answer • Assessment of assignment and record

XVII	4 (T)	Identify various legal issues and laws relevant to nursing practice	**PROFESSIONAL CONSIDERATIONS** • Review – Legal and Ethical Issues • Nursing as a profession – Characteristics of a professional nurse • Nursing practice – philosophy, aim and objectives • Regulatory bodies – INC and SNC constitution and functions • Review – Professional ethics • Code of ethics and professional conduct – INC & ICN • Practice standards for nursing – INC • International Council for Nurses (ICN) • Legal aspects in nursing: • Consumer protection act, patient rights • Legal terms related to practice, legal • system – types of law, tort law & liabilities • Laws related to nursing practice – negligence, malpractice, breach, penalties • Invasion of privacy, defamation of character • Nursing regulatory mechanisms – registration, licensure, renewal, accreditation, nurse practice act, regulation for nurse practitioner/specialist nursing practice		
XVIII	2 (T)	Explain various opportunities for professional advancement	**Professional Advancement** • Continuing Nursing Education • Career opportunities • Membership with professional organizations – national and international • Participation in research activities • Publications – journals, newspaper	• Prepare journal list available in India • Write an article – research/ clinical	• Assessment of assignments

Note: Less than 1 credit lab hours are not specified.

CLINICAL PRACTICUM

Clinical: 2 Credits (80 hours) 2 weeks × 40 hours per week = 80 hours

Practice

Competencies:

Hospital

1. Prepare organizational chart of hospital/Nursing services/nursing department
2. Calculate staffing requirements for a particular nursing unit/ward
3. Formulate Job description at different levels of care
4. Prepare duty roster for staff/students at different levels
5. Participate in procuring/purchase of equipment & supplies
6. Prepare log book/MMF for specific equipment/materials
7. Maintain and store inventory and keep daily records
8. Prepare and maintain various records & reports of the settings – incident reports/adverse reports/audit reports
9. Prepare and implement protocols & manuals
10. Participate in supervision, evaluation and conducting in service education for the staff

College & Hostel

1. Prepare organizational chart of college
2. Formulate job description for tutors
3. Prepare Master plan, time table and clinical rotation
4. Prepare student anecdotes
5. Participate in planning, conducting and evaluation of clinical teaching
6. Participate in evaluation of students 'clinical experience
7. Participate in planning and conducting practical examination OSCE – end of posting

CLINICAL POSTING: Management experience in hospital & college

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - I

including SBA module

PLACEMENT: VI SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Skill Lab**:** 1 Credit (40 hours); Clinical: 3 Credits (240 hours)

COURSE CODE: N-MIDW(I)/OBGN 335

COURSE DESCRIPTION: This course is designed for students to develop knowledge and competencies on the concepts and principles of midwifery. It helps them to acquire knowledge and skills in rendering respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings. It further helps to develop skills in managing normal neonates and participate in family welfare programs.

COMPETENCIES: On completion of the program, the students will be able to

1. Demonstrate professional accountability for the delivery of nursing care as per INC standards/ICM competencies that are consistent with moral, altruistic, legal, ethical, regulatory and humanistic principles in midwifery practice.
2. Communicate effectively with individuals, families and professional colleagues fostering mutual respect and shared decision making to enhance health outcomes.
3. Recognize the trends and issues in midwifery and obstetrical nursing.
4. Review and describe the anatomy and physiology of human reproductive system and conception.
5. Describe and apply physiology in the management of normal pregnancy, birth and puerperium.
6. Demonstrate competency in providing respectful and evidence based maternity care for women during the antenatal, intranatal and postnatal period.
7. Uphold the fundamental human rights of individuals when providing midwifery care.
8. Promote physiologic labour and birth, and conduct normal childbirth.
9. Provide evidence based essential newborn care.
10. Apply nursing process approach in caring for women and their families.
11. Describe the methods of contraception and role of nurse/midwife in family welfare services.
12. Recognize the importance of and actively participate in family welfare programs.
13. Provide youth friendly health services and care for women affected by gender-based violence.

COURSE OUTLINE

T – Theory, SL/L – Skill Lab/Lab, C – Clinical

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	8 (T)	• Explain the history and current scenario of midwifery in India • Review vital health indicators • Describe the various national health programs related to RMNCH+A • Identify the trends and issues in midwifery • Discuss the legal and ethical issues relevant to midwifery practice	**Introduction to midwifery** • History of midwifery in India • *Current scenario:* • Trends of maternity care in India • Midwifery in India – Transformative education for relationship based and transformative midwifery practice in India • Vital health indicators – Maternal mortality ratio, Infant Mortality Rate, Neonatal Mortality Rate, perinatal mortality rate, fertility rates • o Maternal death audit • National health programs related to RMNCH+A (Reproductive Maternal Newborn and Child Health + Adolescent Health) • Current trends in midwifery and OBG nursing: • Respectful maternity and newborn care (RMNC) • Midwifery-led care units (MLCU) • Women centered care, physiologic birthing and de-medicalization of birth • Birthing centers, water birth, lotus birth • Essential competencies for midwifery practice (ICM) • Universal rights of child-bearing women • Sexual and reproductive health and rights • Women‘s expectations & choices about care • Legal provisions in midwifery practice in India: • INC/MOH&FW regulations • ICM code of ethics • Ethical issues in maternal and neonatal care • Adoption laws, MTP act, Pre- Natal Diagnostic Test (PNDT) Act, Surrogate mothers • Roles and responsibilities of a midwife/Nurse practitioner midwife in different settings (hospital/ community) • Scope of practice for midwives	• Discussion • Demonstration • Role play • Directed reading and assignment: ICM competencies • Scenario based learning	• Short answer • Objective type • Essay • Quiz

II	6 (T) 3 (L)	• Review the • anatomy and physiology of human reproductive system	**Anatomy and physiology of human reproductive system and conception (Maternal, Fetal & Newborn physiology)** • *Review:* • Female organs of reproduction • Female pelvis – bones, joints, ligaments, planes, diameters, landmarks, inclination, pelvic variations • Foetal skull – bones, sutures, fontanelles, diameters, moulding • Fetopelvic relationship • Physiology of menstrual cycle, menstrual hygiene • Fertilization, conception and implantation • Embryological development • Placental development and function, placental barrier • Fetal growth and development • Fetal circulation & nutrition	• Lecture • Discussion • Self-directed learning • Models • Videos & films	• Quiz • Short answer • Essay
III	12 (T) 10 (L) 40 (C)	Provide preconception care to eligible couples •	**Assessment and management of normal pregnancy (ante-natal):** • Pre-pregnancy Care • Review of sexual development *(Self Learning)* • Socio-cultural aspects of human sexuality *(Self Learning)* • Preconception care • Pre-conception counseling (including awareness regarding normal birth) Genetic counseling *(Self Learning)* • Planned parenthood **Pregnancy assessment and antenatal care (I, II & III Trimesters)** • Normal pregnancy • Physiological changes during pregnancy • Assess and confirm pregnancy: Diagnosis of pregnancy –Signs, differential diagnosis and confirmatory tests • Review of maternal nutrition & malnutrition • Building partnership with women following RMC protocol • Fathers'engagement in maternity care	• Lecture • Discussion • Demonstration • Self-Learning • Health talk • Role play • Counseling session •	• Short answer • Objective type • Assessment of skills with check list • Case study evaluation • OSCE

		• Describe the physiology, assessment and management of normal pregnancy • Demonstrate knowledge, attitude and skills of midwifery practice throughout 1st,2nd and 3rd trimesters	**Ante-natal care: 1st Trimesters** • Antenatal assessment: History taking, physical examination, breast examination, laboratory investigation • Identification and management of minor discomforts of pregnancy • Antenatal care : as per GoI guidelines • Antenatal counseling (lifestyle changes, nutrition, shared decision making, risky behavior, sexual life during pregnancy, immunization etc.) • Danger signs during pregnancy • Respectful care and compassionate communication • Recording and reporting: as per the GoI guidelines • Role of Doula/ASHAs **II Trimester** • Antenatal assessment: abdominal palpation, fetal assessment, auscultate fetal heart rate – Doppler and pinnard's stethoscope • Assessment of fetal well-being: DFMC, biophysical profile, Non stress test, cardio-tocography, USG, Vibro acoustic stimulation, biochemical tests. • Antenatal care • Women centered care • Respectful care and compassionate communication • Health education on IFA, calcium and vitamin D supplementation, glucose tolerance test, etc. • Education and management of physiological changes and discomforts of 2nd trimester • Rh negative and prophylactic anti D • Referral and collaboration, empowerment • Ongoing risk assessment • Maternal Mental Health	• Case discussion/ presentation • Simulation • Supervised clinical practice • Refer SBA module • & Safe motherhood booklet	

			III Trimester • Antenatal assessment: abdominal palpation, fetal assessment, auscultate fetal heart rate – Doppler and pinnard's stethoscope • Education and management of physiological changes and discomforts of 3rd trimester • Third trimester tests and screening • Fetal engagement in late pregnancy • Childbirth preparation classes • Birth preparedness and complication readiness including micro birth planning • Danger signs of pregnancy – recognition of ruptured membranes • Education on alternative birthing positions – women's preferred choices, birth companion • Ongoing risk assessment • Cultural needs • Women centered care • Respectful and compassionate communication • Health education on exclusive breastfeeding • Role of Doula/ASHA's	• Lab tests – performance and interpretation • Demonstration • Roleplay • Demonstration of antenatal assessment Scenario based learning • Lecture • Simulation • Role play • Refer GoI Guidelines • Health talk • Counseling session • Demonstration of birthing positions • Workshop on alternative birthing positions	
IV	12 (T) 12 (L) 80 (C)	Apply the physiology of labour in promoting normal childbirth Describe the management and care during labour	**Physiology, management and care during labour** • Normal labour and birth • Onset of birth/labour • Per vaginal examination (if necessary) • Stages of labour • Organization of labour room – Triage, preparation for birth • Positive birth environment • Respectful care and communication • Drugs used in labour as per GoI guidelines	• Lecture • Discussion • Demonstration • Bedside clinics • Case discussion/ presentation • Simulated practice • Supervised Clinical practice – Per vaginal examination, Conduction of normal childbirth	• Essay type • Short answer • Objective type • Case study evaluation • Assessment of skills with check list OSCE

		Discuss how to maintain a safe environment for labour Work effectively for pain management during labour Discuss how the midwife provides care and support for the women during birth to enhance physiological birthing and promote normal birth Assess and provide care of the newborn immediately following birth Discuss the impact of labour and birth as a transitional event in the woman's life	**Fist Stage** • Physiology of normal labour • Monitoring progress of labour using Partograph/labour care guide • Assessing and monitoring fetal well being • Evidence based care during 1st stage of labour • Pain management in labour (non-pharmacological) • Psychological support – Managing fear • Activity and ambulation during first stage of labour • Nutrition during labour • Promote positive childbirth experience for women • Birth companion • Role of Doula/ASHA's • **Second stage** • Physiology (Mechanism of labour) • Signs of imminent labour • Intrapartum monitoring • Birth position of choice • Vaginal examination • Psychological support • Non-directive coaching • Evidence based management of physiological birth/Conduction of normal childbirth • Essential newborn care (ENBC) • Immediate assessment and care of the newborn • Role of Doula/ASHA's • **Third Stage** • Physiology – placental separation and expulsion, hemostasis • Physiological management of third stage of labour • Active management of third stage of labour (recommended) • Examination of placenta, membranes and vessels • Assess perineal, vaginal tear/ injuries and suture if required • Insertion of postpartum IUCD • Immediate perineal care • Initiation of breast feeding • Skin to skin contact • Newborn resuscitation **Fourth Stage** • Observation, Critical Analysis and Management of mother and newborn • Maternal assessment, observation fundal height, uterine consistency, urine output, blood loss • Documentation and Record of birth	• Refer SBA module • LaQshya guidelines • Dakshata guidelines • Refer ENBC, NSSK module • Demonstration • Group work • Scenario based learning • Simulation • Role play • Demonstration Videos	

		Ensure initiation of breast feeding and adequate latching	• Breastfeeding and latching • Managing uterine cramp • Alternative/complementary therapies • Role of Doula/ASHA's • Various childbirth practices • Safe environment for mother and newborn to promote bonding • Maintaining records and reports		
V	7 (T) 6 (L) 40 (C)	Describe the physiology, management and care of normal puerperium	**Postpartum care/Ongoing care of women** • Normal puerperium – Physiology, duration • Post-natal assessment and care – facility and home-based care • Perineal hygiene and care • Bladder and bowel function • Minor disorders of puerperium and its management • Physiology of lactation and lactation management • Postnatal counseling and psychological support • Normal postnatal baby blues and recognition of post-natal depression • Transition to parenthood • Care for the woman up to 6 weeks after childbirth • Cultural competence (Taboos related to postnatal diet and practices) • Diet during lactation-review • Post-partum family planning • Follow-up of postnatal mothers • Drugs used in the postnatal period • Records and reports	• Lecture • Discussion • Demonstration • Health talk • Simulated practice • Supervised clinical practice • Refer SBA module	• Essay type • Short answer • Objective type • Assessment of skills with checklist • OSCE
VI	7 (T) 7 (L) 40 (C)	Discuss the need for and provision of compassionate, family centered midwifery care of the newborn Describe the assessment and care of normal neonate	**Assessment and ongoing care of normal neonates** • Family centered care • Respectful newborn care and communication • Normal Neonate – Physiological adaptation • Newborn assessment – Screening for congenital anomalies • Care of newborn up to 6 weeks after the childbirth (Routine care of newborn) Skin to skin contact and thermoregulation • Infection prevention • Immunization • Minor disorders of newborn and its management	• Lecture • Discussion • Demonstration • Simulated practice session • Supervised clinical practice • Refer safe deliver app module – newborn management • Partial completion of SBA module	• Essay type • Short answer • Objective type • Assessment of skills with checklist • OSCE

VII	8 (T) 2 (L) 40 (C)	Explain various methods of family planning and role of nurse/midwife in providing family planning services	**Family welfare services** • Impact of early/frequent childbearing • Comprehensive range of family planning methods o Temporary methods – Hormonal, non-hormonal and barrier methods o Permanent methods – Male sterilization and female sterilization • Action, effectiveness, advantages, disadvantages, myths, misconception and medical eligibility criteria (MEC) for use of various family planning methods • Emergency contraceptives • Recent trends and research in contraception • Family planning counseling using Balanced Counseling Strategy (BCS) • Legal and rights aspects of FP • Human rights aspects of FP adolescents • Youth friendly services – SRHR services, policies affecting SRHR and attitude of nurses and midwives in provision of services (Review) • Importance of follow up and recommended timing	• Lecture • Supervised practice • Field visits • Scenario based learning • Discussion • GoI guidelines – injectable contraceptives, oral contraceptives, IUCD, male and female sterilization	• Essay type • Short answers • Objective type • Field visit reports • Vignettes
		Describe youth friendly services and role of nurses/ midwives Recognize the role of nurses/midwives in gender based violence	**Gender related issues in SRH** • Gender based violence – Physical, sexual and abuse, Laws affecting GBV and role of nurse/midwife • Special courts for abused people • Gender sensitive health services including family planning		

PRACTICUM

PLACEMENT: VI & VII SEMESTER

VI SEMESTER: MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - I

SKILL LAB & CLINICAL: Skill Lab – 1 Credit (40 hours); Clinical – 3 Credits (240 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Counsel women and their families on pre-conception care
2. Demonstrate lab tests ex. urine pregnancy test
3. Perform antenatal assessment of pregnant women
4. Assess and care for normal antenatal mothers
5. Assist and perform specific investigations for antenatal mothers
6. Counsel mothers and their families on antenatal care and preparation for parenthood
7. Conduct childbirth education classes
8. Organize labour room
9. Prepare and provide respectful maternity care for mothers in labour
10. Perform per-vaginal examination for a woman in labour if indicated
11. Conduct normal childbirth with essential newborn care
12. Demonstrate skills in resuscitating the newborn
13. Assist women in the transition to motherhood
14. Perform postnatal and newborn assessment
15. Provide care for postnatal mothers and their newborn
16. Counsel mothers on postnatal and newborn care
17. Perform PPIUCD insertion and removal
18. Counsel women on family planning and participate in family welfare services
19. Provide youth friendly health services
20. Identify, assess, care and refer women affected with gender-based violence

SKILL LAB: Procedures/Skills for demonstration and return demonstration:

1. Urine pregnancy test
2. Calculation of EDD, Obstetrical score, gestational weeks
3. Antenatal assessment
4. Counseling antenatal mothers
5. Micro birth planning
6. PV examination
7. Monitoring during first stage of labour – Plotting and interpretation of partograph
8. Preparation for delivery – setting up labour room, articles, equipment
9. Mechanism of labour – normal
10. Conduction of normal childbirth with essential newborn care
11. Active management of third stage of labour
12. Placental examination
13. Newborn resuscitation
14. Monitoring during fourth stage of labour
15. Postnatal assessment
16. Newborn assessment
17. Kangaroo mother care
18. Family planning counseling
19. PPIUCD insertion and removal

CLINICAL POSTINGS (6 weeks × 40 hours per week = 240 hours)

Clinical Area	Duration (weeks)	Clinical Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
• Antenatal OPD and Antenatal ward	• 1 week	• Perform antenatal assessment • Perform laboratory tests for antenatal women and assist in selected antenatal diagnostic procedures • Counsel antenatal women	• History collection • Physical examination • Obstetric examination • Pregnancy confirmation test • Urine testing • Blood testing for Hemoglobin, grouping & typing • Blood test for malaria • KICK chart • USG/NST • Antenatal counseling • Preparation for childbirth • Birth preparedness and complication readiness	• Antenatal palpation • Health talk • Case study	• OSCE • Case • presentation
• Labour room	• 3 weeks	• Monitor labour using partograph • Provide care to women during labour • Conduct normal childbirth, provide care to mother and immediate care of newborn	• Assessment of woman in labour • Partograph • Per vaginal examination when indicated • Care during first stage of labour • Pain management techniques • Upright and alternative positions in labour • Preparation for labour – articles, physical, psychological • Conduction of normal childbirth • Essential newborn care • Newborn resuscitation • Active management of third stage of labour • Monitoring and care during fourth stage of labour	• Partograph recording • PV examination • Assisting/ Conduction of normal childbirth • Case study • Case • presentation • Episiotomy and suturing if indicated • Newborn resuscitation	• Assignment • case study • Case presentation • OSCE

Post-partum Ward including FP unit	2 weeks	Perform postnatal assessment Provide care to normal postnatal mothers and Newborn Provide postnatal counseling Provide family welfare services	• Postnatal assessment • Care of postnatal mothers – normal • Care of normal newborn • Lactation management • Postnatal counseling • Health teaching on postnatal and newborn care • Family welfare counseling	• Postnatal assessment • Newborn assessment • Case study • Case presentation • PPIUCD insertion & removal	• Assignment • Case study • Case presentation

Note: Partial Completion of SBA module during VI semester

VII SEMESTER

MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING - II

PRACTICUM

SKILL LAB & CLINICAL: Skill Lab – 1 Credit (40 hours); Clinical – 4 Credits (320 hours)

PRACTICE COMPETENCIES: On completion of the course, the students will be able to:

1. Identify, stabilize and refer antenatal women with complications
2. Provide care to antenatal women with complications
3. Provide post abortion care& counselling
4. Assist in the conduction of abnormal vaginal deliveries and caesarean section.
5. Demonstrate skills in resuscitating the newborn
6. Assist and manage complications during labour
7. Identify postnatal and neonatal complications, stabilize and refer them
8. Provide care for high risk antenatal, intranatal and postnatal women and their families using nursing process approach
9. Provide care for high risk newborn
10. Assist in advanced clinical procedures in midwifery and obstetric nursing
11. Provide care for women during their non-childbearing period.
12. Assess and care for women with gynecological disorders
13. Demonstrate skills in performing and assisting in specific gynecological procedures
14. Counsel and care for couples with infertility

SKILL LAB: Procedures/Skills for demonstration and return demonstration:

1. Antenatal assessment and identification of complications
2. Post abortion care & counseling
3. Counseling antenatal women for complication readiness
4. Mechanism of labour – abnormal
5. Assisting in the conduction of abnormal vaginal deliveries and caesarean section.
6. Management of complications during pregnancy/labour/post partum (case studies/simulated scenarios)
7. Administration of Inj. Magnesium sulphate
8. Starting and maintaining an oxytocin drip for PPH
9. Management of PPH – Bimanual compression of uterus
10. Management of PPH – Balloon tamponade
11. Instruments used in obstetrics and gynecology
12. Visual inspection of cervix with acetic acid
13. Cervical biopsy
14. Breast examination
15. Counseling of infertile couples

CLINICAL POSTINGS (8 weeks × 40 hours per week = 320 hours)

Clinical Areas	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
Antenatal OPD/ infertility clinics/ Reproductive medicine and antenatal ward	2 weeks	Perform/assist in selected advanced antenatal diagnostic procedures Provide antenatal care for women with complications of pregnancy Counsel antenatal mothers Provide post abortion care and postnatal counselling Provide counselling and support to infertile couples	• Kick chart, DFMC • Assist in NST/CTG/USG • Assisting in advanced diagnostic procedures • Care of antenatal women with complications in pregnancy • Antenatal counselling • Preparation for childbirth, Birth preparedness and complication readiness • Post abortion care • Post abortion counselling • Counselling infertile couples	• Antenatal palpation • Health talk • Case study	• Simulation • Case • presentation • OSCE
Labour room	2 weeks	Conduction of normal childbirth Conduct/assist in abnormal deliveries Monitor labour using partograph Identify and manage complications during labour	• Assessment of woman in labour • Partograph • Per-vaginal examination if indicated • Obstetric examination • Care during first stage of labour • Pain management techniques • Upright and alternative positions in labour • Preparation for labour – • articles, physical, psychological • Conduction of normal childbirth • Essential newborn care • Newborn resuscitation • Active management of third stage of labour • Monitoring and care during fourth stage of labour • Identification, stabilization, referral and assisting in management of prolonged labour, cervical dystocia, CPD, contracted pelvis	• Partograph recording • Pain • management during labour • Conduction of normal childbirth • Assisting in abnormal deliveries • Managing complication during labour • Case study • Case • presentation	• Assignment • Case study • Case • presentation • Simulation • OSCE

			• Assist in the management of abnormal deliveries – posterior position, breech deliveries, twin deliveries, vacuum extraction, forceps delivery, shoulder dystocia • Assist in cervical encerclage procedures, D&C, D&E • Identify, assist and manage trauma to the birth canal, retained placenta, post partum hemorrhage, uterine atony • Management of obstetric shock		
Postnatal Ward	1 week	Perform postnatal assessment and identify postnatal complications Provide postnatal care Provide family welfare services	• Postnatal history collection and physical examination • Identify postnatal complications • Care of postnatal mothers – abnormal deliveries, caesarean section • Care of normal newborn • Lactation management • Postnatal counselling • Health teaching on postnatal and newborn care • Family welfare counselling	• Health talk • Postnatal assessment • Newborn assessment • Case studies • Case • presentation • PPIUCD insertion and removal	• Role play • Assignment • Case study • Case • presentation • Simulation • Vignettes • OSCE
Neonatal Intensive Care Unit	1week	Perform assessment of newborn and identify complications/congenital anomalies Perform neonatal resuscitation Care of high risk newborn Provide care for newborns in ventilator, incubator etc Assist/perform special neonatal procedures	• Neonatal assessment – identification of complication, congenital anomalies. • Observation of newborn • Neonatal resuscitation • Phototherapy and management of jaundice in newborn • Assist in Exchange transfusion • Neonatal feeding – spoon and katori, paladai, NG tube • Care of baby in incubator, ventilator, warmer • Infection control in the nursery • Neonatal medications • Starting IV line for newborn, drug calculation	• Case study • Case • presentation • Assignments • Simulated practice	• Case • presentation • Care study • Care plan • Simulation, Vignettes • OSCE

Obstetric/ Gynae operation theatre & Gynecology ward	2weeks	Assist in gynecological and obstetric surgeries Care for women with gynecological disorders	• Observe/Assist in caesarean section • Management of retained placenta • Gynecological surgeries • Hysterectomy • Uterine rupture • Care of women with gynecological conditions • Health education	• Assisting in obstetric and gynecological surgery • Tray set-up for • caesarean section • Care plan	• Assignment • Tray set-up for obstetric and gynecological surgeries • Case • presentation • Simulation • Vignettes

Note: Completion of safe delivery App module during VII Semester

SYLLABUS

VII SEMESTER

B.Sc. NURSING

COMMUNITY HEALTH NURSING – II

PLACEMENT: VII SEMESTER

THEORY: 5 Credits (100 hours) – includes lab hours also

PRACTICUM: Clinical: 2 Credit (160 hours)

COURSE CODE: N-COMH(II) 401

COURSE DESCRIPTION: This course is designed to help students gain broad perspective of specialized roles and responsibilities of community health nurses and to practice in various specialized health care settings. It helps students to develop knowledge and competencies required for assessment, diagnosis, treatment, and nursing management of individuals and families within the community in wellness and illness continuum.

COMPETENCIES: On completion of the course, the students will be able to

1. Demonstrate beginning practice competencies/skills relevant to provide comprehensive primary health care/community- based care to clients with common diseases and disorders including emergency and first aid care at home/clinics/centres as per predetermined protocols/drug standing orders approved by MOH&FW
2. Provide maternal, newborn and child care, and reproductive health including adolescent care in the urban and rural health care settings
3. Describe the methods of collection and interpretation of demographic data
4. Explain population control and its impact on the society and describe the approaches towards limiting family size
5. Describe occupational health hazards, occupational diseases and the role of nurses in occupational health programs
6. Identify health problems of older adults and provide primary care, counseling and supportive health services
7. Participate in screening for mental health problems in the community and providing appropriate referral services
8. Discuss the methods of data collection for HMIS, analysis and interpretation of data
9. Discuss about effective management of health information in community diagnosis and intervention
10. Describe the management system of delivery of community health services in rural and urban area

11. Describe the leadership role in guiding, supervising, and monitoring the health services and the personnel at the PHCs, SCs and community level including financial management and maintenance of records & reports
12. Describe the roles and responsibilities of Mid-Level Health Care Providers (MHCPs) in Health Wellness Centers (HWCs
13. Identify the roles and responsibilities of health team members and explain their job description
14. Demonstrate initiative in preparing themselves and the community for disaster preparedness and management
15. Demonstrate skills in proper bio-medical waste management as per protocols
16. Explain the roles and functions of various national and international health agency

COURSE OUTLINE

T – Theory

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching / Learning Activities	Assessment Methods
I	10 (T)	Explain nurses' role in identification, primary management and referral of clients with common disorders/ conditions and emergencies including first aid	**Management of common conditions and emergencies including first aid** • Standing orders: Definition, uses • Screening, diagnosing/ identification, primary care and referral of Gastrointestinal System • Abdominal pain • Nausea and vomiting • Diarrhea • Constipation • Jaundice • GI bleeding • Abdominal distension • Dysphagia and dyspepsia oAphthous ulcers Respiratory System • Acute upper respiratory infections – Rhinitis, Sinusitis, Pharyngitis, Laryngitis, • Tonsillitis • Acute lower respiratory infections – Bronchitis, pneumonia and bronchial asthma • Hemoptysis, Acute chest pain • Heart & Blood • Common heart diseases – Heart attack/coronary artery disease, heart failure, arrhythmia • Blood anemia, blood cancers, bleeding disorders • Eye & ENT conditions • Eye – local infections, redness of eye, conjunctivitis, stye, trachoma and refractive errors • ENT – Epistaxis, ASOM, sore throat, deafness • Urinary System • Urinary tract infections – cystitis, pyelonephritis, prostatitis, UTIs in children • First aid in common emergency conditions – Review • High fever, low blood sugar, minor injuries, fractures, fainting, bleeding, shock, stroke, bites, burns, choking, seizures, RTAs, poisoning, drowning and foreign bodies	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice • Assessment of clients with common conditions and provide referral	• Short answer • Essay • Field visit reports • OSCE assessment

II	20 (T)	Provide reproductive, maternal, newborn and childcare, including adolescent care in the urban and rural health care settings	**Reproductive, maternal, newborn, child and adolescent Health (Review from OBG Nursing and application in community setting)** • Present situation of reproductive, maternal and child health in India **Antenatal care** • Objectives, antenatal visits and examination, nutrition during pregnancy, counseling • Calcium and iron supplementation in pregnancy • Antenatal care at health centre level • Birth preparedness • High risk approach – Screening/early identification and primary management of complications – Antepartum hemorrhage, pre-eclampsia, eclampsia, Anemia, Gestational diabetes mellitus, Hypothyroidism, Syphilis • Referral, follow up and maintenance of records and reports **Intra natal care** • Normal labour – process, onset, stages of labour • Monitoring and active management of different stages of labour • Care of women after labour • Early identification, primary management, referral and follow up – preterm labour, fetal distress, prolonged and obstructed labour, vaginal & perennial tears, ruptured uterus • Care of newborn immediately after birth • Maintenance of records and reports • Use of Safe child birth check list • SBA module – Review • Organization of labour room **Postpartum care** • Objectives, Postnatal visits, care of mother and baby, breast feeding, diet during lactation, and health counseling • Early identification, primary management, referral and follow up of complications, Danger signs-postpartum hemorrhage, shock, puerperal sepsis, breast conditions, post-partum depression • Postpartum visit by health care provider	• Lecture • Discussion • Demonstration • Role play • Suggested field visits and field practice • Assessment of antenatal, postnatal, newborn, infant, preschool child, school child, and adolescent health	• Short answer • Essay • OSCE assessment

		Promote adolescent health and youth friendly services	**Newborn and child care** • *Review:* Essential newborn care • Management of common neonatal problems • Management of common child health problems: Pneumonia, Diarrhoea, Sepsis, screening for congenital anomalies and referral • *Review:* IMNCI Module • Under five clinics **Adolescent Health** • Common health problems and risk factors in adolescent girls and boys • Common Gynecological conditions – dysmenoorhea, Premenstrual Syndrome (PMS), Vaginal discharge, Mastitis, Breast lump, pelvic pain, pelvic organ prolapse • Teenage pregnancy, awareness about legal age of marriage, nutritional status of adolescents National Menstrual Hygiene scheme • Youth friendly services: o SRH Service needs o Role and attitude of nurses: Privacy, confidentiality, non judgemental attitude, client autonomy, respectful care and communication • Counseling for parents and teenagers (BCS – balanced counseling strategy) **National Programs** • RMNCH+A Approach – Aims, Health systems strengthening, RMNCH+A strategies, Interventions across life stages, program management, monitoring and evaluation systems • Universal Immunization Program (UIP) as per Government of India guidelines – Review • Rashtriya Bal Swasthya Karyakaram (RSBK) -children • Rashtriya Kishor Swasthya Karyakram (RKSK) – adolscents Any other new programs	• Screen, manage and refer adolescents • Counsel adolescents	

III	4 (T)	Discuss the concepts and scope of demography	**Demography, Surveillance and Interpretation of Data** • *Demography and vital statistics* – demographic cycle, world population trends, vital statistics • Sex ratio and child sex ratio, trends of sex ratio in India, the causes and social implications • *Sources of vital statistics* – Census, registration of vital events, sample registration system • *Morbidity and mortality indicators* – • Definition, calculation and interpretation • Surveillance, Integrated disease surveillance project (IDSP), Organization of IDSP, flow of information and mother and child tracking system (MCTS) in India • Collection, analysis, interpretation, use of data • *Review:* Common sampling techniques – random and nonrandom techniques • Disaggregation of data	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Short answer • Essay
IV	6 (T)	Discuss population explosion and its impact on social and economic development of India Describe the various methods of population control	**Population and its Control** • Population Explosion and its impact on Social, Economic development of individual, society and country. • Population Control – Women Empowerment; Social, Economic and Educational Development • Limiting Family Size – Promotion of small family norm, Temporary Spacing Methods (natural, biological, chemical, mechanical methods etc.), Terminal Methods (Tubectomy, Vasectomy) • Emergency Contraception • Counseling in reproductive, sexual health including problems of adolescents • Medical Termination of pregnancy and MTP Act • National Population Stabilization Fund/JSK (Jansankhya Sthirata Kosh) • Family planning 2020 • National Family Welfare Program • Role of a nurse in Family Welfare Program	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Short answer • Essay • OSCE assessment • Counseling on family planning

V	5 (T)	Describe occupational health hazards, occupational diseases and the role of nurses in occupational health programs	**Occupational Health** • Occupational health hazards • Occupational diseases • ESI Act • National/ State Occupational Health Programs • Role of a nurse in occupational health services – Screening, diagnosing, management and referral of clients with occupational health problems	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Essay • Short answer • Clinical performance evaluation
VI	6 (T)	Identify health problems of older adults and provide primary care, counseling and supportive health services	**Geriatric Health Care** • Health problems of older adults • Management of common geriatric ailments: counseling, supportive treatment of older adults • Organization of geriatric health services • National program for health care of elderly (NPHCE) • State level programs/Schemes for older adults • Role of a community health nurse in geriatric health services – Screening, diagnosing, management and referral of older adults with health problems	• Lecture • Discussion • Demonstration	• Visit report on elderly home • Essay • Short answer
VII	6 (T)	Describe screening for mental health problems in the community, take preventive measures and provide appropriate referral services	**Mental Health Disorders** • Screening, management, prevention and referral for mental health disorders • *Review:* o Depression, anxiety, acute psychosis, Schizophrenia o Dementia o Suicide o Alcohol and substance abuse o Drug deaddiction program o National Mental Health Program o National Mental Health Policy o National Mental Health Act • Role of a community health nurse in screening, initiation of treatment and follow up of mentally ill clients	• Lecture • Discussion • Demonstration • Role play • Health counseling on promotion of mental health • Suggested field visits • Field practice	• Essay • Short answer • Counseling report

VIII	4 (T)	Discuss about effective management of health information in community diagnosis and intervention	**Health Management Information System (HMIS)** • Introduction to health management system: data elements, recording and reporting formats, data quality issues • *Review:* • Basic Demography and vital statistics • Sources of vital statistics • Common sampling techniques, frequency distribution • Collection, analysis, interpretation of data • Analysis of data for community needs assessment and preparation of health action plan	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice • Group project on community diagnosis – data	• Group project report • Essay • Short answer
IX	12 (T)	Describe the system management of delivery of community health services in rural and urban areas	**Management of delivery of community health services:** • Planning, budgeting and material management of CHC, PHC, SC/HWC • **Manpower planning as per IPHS standards** • **Rural:** Organization, staffing and material management of rural health services provided by Government at village, SC/HWC, PHC, CHC, hospitals – district, state and central • **Urban:** Organization, staffing, and functions of urban health services provided by Government at slums, dispensaries, special clinics, municipal and corporate hospitals • Defense services • Institutional services • Other systems of medicine and health: Indian system of medicine, AYUSH clinics, Alternative health care system referral systems, Indigenous health services	• Lecture • Discussion • Visits to various health care delivery systems • Supervised field practice	• Essay • Short answer • Filed visit reports

X	15 (T)	• Describe the leadership role in guiding, supervising, and monitoring the health services and the personnel at the PHCs, SCs and community level including financial management • Describe the roles and responsibilities of Mid-Level Health Care Providers (MHCPs) in Health Wellness Centers (HWCs)	**Leadership, Supervision and Monitoring** • Understanding work responsibilities/job description of DPHN, Health Visitor, PHN, MPHW (Female), Multipurpose health Worker (Male), AWWs and ASHA • Roles and responsibilities of Mid-Level Health Care Providers (MLHPs) • Village Health Sanitation and Nutrition Committees (VHSNC): objectives, composition and roles & responsibilities • Health team management • *Review*: Leadership & supervision – concepts, principles & methods • Leadership in health: leadership approaches in healthcare setting, taking control of health of community and organizing health camps, village clinics • Training, Supportive supervision and monitoring – concepts, principles and process e.g. performance of frontline health workers **Financial Management and Accounting & Computing at Health Centers (SC)** • Activities for which funds are received • Accounting and book keeping requirements o accounting principles & policies, book of accounts to be maintained, basic accounting entries, accounting process, payments & expenditure, fixed asset, SOE reporting format, utilization certificate (UC) reporting • Preparing a budget • Audit **Records & Reports:** • *Concepts of records and reports* – importance, legal implications, purposes, use of records, principles of record writing, filing of records • *Types of records* – community related records, registers, guidelines for maintaining	• Lecture • Discussion • Demonstration • Role play • Suggested field visits • Field practice	• Report on interaction with MPHWs, HVs , ASHA, AWWs • Participation in training programs • Essay • Short answer

			• *Electronic Medical Records (EMR)* – capabilities and components of EMR, electronic health record (EHR), levels of automation, attributes, benefits and disadvantages of HER • **Nurses' responsibility in record keeping and reporting**		
XI	6 (T)	Demonstrate initiative in preparing themselves and the community for disaster preparedness and management	**Disaster Management** • Disaster types and magnitude • Disaster preparedness • Emergency preparedness • Common problems during disasters and methods to overcome • Basic disaster supplies kit • Disaster response including emergency relief measures and Life saving techniques • Use disaster management module	• Lecture • Discussion • Demonstration • Role play • Suggested field visits, and field practice • Mock drills • Refer Disaster module (NDMA) National Disaster/INC – Reaching out in emergencies	
XII	3 (T)	Describe the importance of bio- medical waste management, its process and management	**Bio-Medical Waste Management** • Waste collection, segregation, transportation and management in the community • Waste management in health center/clinics • Bio-medical waste management guidelines • – 2016, 2018 (Review)	• Lecture cum Discussion • Field visit to waste management site	• Field visit report
XIII	3 (T)	Explain the roles and functions of various national and international health agencies	**Health Agencies** • **International:** WHO, UNFPA, UNDP, World Bank, FAO, UNICEF, European Commission, Red Cross, USAID, UNESCO, ILO, CAR, CIDA, JHPIEGO, any other • **National:** Indian Red Cross, Indian Council for Child Welfare, Family Planning Association of India, Tuberculosis Association of India, Central Social Welfare Board, All India Women's Conference, Blind Association of India, any other **Voluntary Health Association of India (VHA)**	• Lecture • Discussion Field visits	• Essay • Short answer

COMMUNITY HEALTH NURSING II

Clinical practicum – 2 credits (160 hours) CLINICAL POSTINGS (4 weeks × 40 hours per week)

Clinical Area	Duration (Weeks)	Learning Outcomes	Procedural Competencies/ Clinical Skills	Clinical Requirements	Assessment Methods
• Urban • Rural	• 2 weeks • 2 Weeks	• Screen, diagnose, manage and refer clients with common conditions/ emergencies	• Screening, diagnosing, management and referral of clients with common conditions/ emergencies	• Screening, diagnosing, Primary management and care based on standing orders/protocols approved by MOH&FW • Minor ailments – 2 • Emergencies – 1 • Dental problems – 1 • Eye problems – 1	• Clinical performance assessment • OSCE during posting • Final clinical examination (University)
		• Assess and provide antenatal, intrapartum, postnatal and new-born care	• Assessment (physical & nutritional) of antenatal, intrapartum, postnatal and newborn • Conduction of normal delivery at health center • Newborn care	• Ear, nose, and throat problems – 1 • High risk pregnant woman – 1 • High risk neonate – 1 • Assessment of antenatal – 1, intrapartum – 1, postnatal – 1 and newborn – 1 • Conduction of normal delivery at health center and documentation – 2 • Immediate newborn care and documentation – 1	• Clinical performance assessment • OSCE
		• Promote adolescent health	• Counsel adolescents • Family planning counselling	• Adolescent counseling – 1 • Family planning counselling – 1	• Family Case study evaluation
		• Provide family welfare services	• Distribution of temporary contraceptives – condoms, OCP‘s, emergency contraceptives	•	
		• Screen, diagnose, manage and refer clients with occupational health problem	• Screening, diagnosing, management and referral of clients with occupational health problems •	• Family case study – 1 (Rural/Urban) • Screening, diagnosing, management and referral of clients with occupational health problems – 1	• Clinical performance evaluation
		• Screen, assess and manage elderly with health problems and refer appropriately	• Health assessment of elderly	• Screen, assess and manage elderly with health problems and refer appropriately • Health assessment (Physical & nutritional) of elderly – 1	

		Screen, diagnose, manage and refer clients who are mentally unhealthy	Mental health screening	Mental health screening survey – 1	OSCE
		Participate in community diagnosis – data management	Participation in Community diagnosis – data management	**Group project:** Community diagnosis – data management	Project evaluation
		Participate in health centre activities	Writing health center activity report	Write report on health center activities – 1	
		Organize and conduct clinics/health camps in the community	Organizing and conducting clinics/camp	Organizing and conducting Antenatal/under-five clinic/Health camp – 1	
		Prepare for disaster preparedness and management	Participation in disaster mock drills	Participation in disaster mock drills	
		Recognize the importance and observe the biomedical waste management process		Field visit to bio-medical waste management site Visit to AYUSH clinic	

NURSING RESEARCH AND STATISTICS

PLACEMENT: VII SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICUM: Lab/Skill Lab: 1 Credit (40 hours) Clinical Project: 40 hours

COURSE CODE: NRST 405

COURSE DESCRIPTION: The Course is designed to enable students to develop an understanding of basic concepts of research, research process and statistics. It is further, structured to conduct/ participate in need-based research studies in various settings and utilize the research findings to provide quality nursing care. The hours for practical will be utilized for conducting individual/group research project.

COMPETENCIES: On completion of the course, students will be competent to

1. Identify research priority areas
2. Formulate research questions/problem statement/hypotheses
3. Review related literature on selected research problem and prepare annotated bibliography
4. Prepare sample data collection tool
5. Analyze and interpret the given data
6. Practice computing, descriptive statistics and correlation
7. Draw figures and types of graphs on given select data
8. Develop a research proposal
9. Plan and conduct a group/individual research project

COURSE OUTLINE

T – Theory, P – Practicum

Unit	Time (Hrs.)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	6		Describe the concept of research, terms, need and areas of research in nursing Explain the steps of research process State the purposes and steps of Evidence Based Practice	• Research and Research Process • Introduction and need for nursing research • Definition of Research & nursing research • Steps of scientific method • Characteristics of good research • Steps of Research process – overview • Evidence Based Practice – Concept, Meaning, Purposes, Steps of EBP Process and	• Lecture cum Discussion • Narrate steps of research process followed from examples of published studies • Identify research priorities on a given area/ specialty • List examples of Evidence Based Practice	• Short answer • Objective type
II	2	8	Identify and state the research problem and objectives	• Research Problem/Question • Identification of problem area • Problem statement • Criteria of a good research problem • Writing objectives and hypotheses	• Lecture cum Discussion • Exercise on writing statement of problem and objectives	• Short answer • Objective type • Formulation of research questions/ objectives/ hypothesis
III	2	6	Review the related literature	• Review of Literature • Location • Sources • On line search; CINHAL, COCHRANE etc. • Purposes • Method of review	• Lecture cum Discussion • Exercise on reviewing one research report/ article for a selected research problem • Prepare annotated Bibliography	• Short answer • Objective type • Assessment of review of literature on given topic presented
IV	4	1	Describe the Research approaches and designs	• Research Approaches and Designs • Historical, survey and experimental • Qualitative and Quantitative designs	• Lecture cum Discussion • Identify types of research approaches used from examples of published and unpublished research • Studies with rationale	• Short answer • Objective type

V	6	6 40 Hrs (Clinical Project)	Explain the Sampling process Describe the methods of data collection	• Sampling and data Collection • Definition of Population, Sample • Sampling criteria, factors influencing sampling process, types of sampling techniques • Data – why, what, from whom, when and where to collect • Data collection methods and instruments • Methods of data collection • Questioning, interviewing • Observations, record analysis and measurement • Types of instruments, Validity & Reliability of the Instrument • Research ethics • Pilot study • Data collection procedure	• Lecture cum Discussion • Reading assignment on examples of data collection tools • Preparation of sample data collection tool • Conduct group research project	• Short answer • Objective type • Developing questionnaire/ Interview Schedule/ Checklist
VI	4	6	Analyze, Interpret and summarize the research data	**Analysis of data** • Compilation, Tabulation, classification, summarization, presentation, interpretation of data	Lecture cum Discussion Preparation of sample tables	Short answer Objective type Analyze and interpret given data
VII	12	8	Explain the use of statistics, scales of measurement and graphical presentation of data Describe the measures of central tendency and variability and methods of Correlation	**Introduction to Statistics** Definition, use of statistics, scales of measurement.	• Lecture cum Discussion • Practice on graphical presentations • Practice on computation of measures of central tendency, variability • & correlation	• Short answer • Objective type • Computation of descriptive statistics
VIII	4	5	Communicate and utilize the research findings	**Communication and utilization of Research** • Communication of research findings • Verbal report • Writing research report • Writing scientific article/paper • Critical review of published research including publication ethics • Utilization of research findings • Conducting group research project	• Lecture cum Discussion • Read/ Presentations of a sample published/ unpublished research report • Plan, conduct and Write individual/group research project	• Short answer • Objective type • Oral • Presentation • Development of research proposal • Assessment of research Project

MIDWIFERY/OBSTETRIC AND GYNECOLOGY NURSING - II

including Safe Delivery App Module

PLACEMENT: VII SEMESTER

THEORY: 3 Credits (60 hours)

PRACTICUM: Skill Lab: 1 Credit (40 Hours) Clinical: 4 Credits (320 Hours)

COURSE CODE: N-MIDW(II)/OBGN 410

COURSE DESCRIPTION: This course is designed for students to develop knowledge and competencies on the concepts and principles of obstetric and gynecology nursing. It helps them to acquire knowledge and skills in rendering respectful maternity care to high risk woman during antenatal, natal and postnatal periods in hospitals and community settings and help to develop skills in initial management and referral of high-risk neonates. It would also help students to gain knowledge, attitude and skills in caring for women with gynecological disorders.

COMPETENCIES: On completion of the course, the students will be able to:

1. Describe the assessment, initial management, referral and respectful maternity care of women with high risk pregnancy.
2. Demonstrate competency in identifying deviation from normal pregnancy.
3. Describe the assessment, initial management, referral and nursing care of women with high risk labour.
4. Assist in the conduction of abnormal vaginal deliveries and caesarean section.
5. Describe the assessment, initial management, referral and nursing care of women with abnormal postnatal conditions.
6. Demonstrate competency in the initial management of complications during the postnatal period.
7. Demonstrate competency in providing care for high risk newborn.
8. Apply nursing process in caring for high risk women and their families.
9. Describe the assessment and management of women with gynecological disorders.
10. Demonstrate skills in performing and assisting in specific gynecological procedures.
11. Describe the drugs used in obstetrics and gynecology.
12. Counsel and care for couples with infertility.
13. Describe artificial reproductive technology.

COURSE OUTLINE

T – Theory, SL/L – Skill Lab, C – Clinical

Unit	Time (Hrs.)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
I	12 (T) 10 (L) 80 (C)	Describe the assessment, initial management, and referral of women with problems during pregnancy Support women with complicated pregnancy and facilitate safe and positive birthing outcome	**Recognition and Management of problems during Pregnancy** • Assessment of high-risk pregnancy **Problems/Complications of Pregnancy** • Hyper-emesis gravidarum, • Bleeding in early pregnancy – abortion, ectopic pregnancy, vesicular mole • Unintended or mistimed pregnancy • Post abortion care & counseling • Bleeding in late pregnancy placenta previa, abruption placenta, trauma • Medical conditions complicating pregnancy – Anemia, PIH/Pre-eclampsia, Eclampsia, GDM, cardiac disease, pulmonary disease, thyrotoxicosis, STDs, HIV, Rh incompatibility • Infections in pregnancy – urinary tract infection, bacterial, viral, protozoal, fungal, malaria in pregnancy • Surgical conditions complicating pregnancy – appendicitis, acute abdomen • COVID-19 & pregnancy and children • Hydramnios • Multiple pregnancy • Abnormalities of placenta and cord • Intra uterine growth restriction • Intra uterine fetal death • Gynaecological conditions complicating pregnancy • Mental health issues during pregnancy • Adolescent pregnancy • Elderly primi, grand multiparity • Management and care of conditions as per the GoI protocol • Policy for the referral services • Drugs used in management of high-risk pregnancies • Maintenance of records and reports	• Lecture • Discussion • Demonstration • Video & films • Scan reports • Case discussion • Case presentation • Drug presentation • Health talk • Simulation • Role play • Supervised Clinical practice • WHO midwifery toolkit • GoI guideline – screening for hypothyroidism, screening for syphilis, deworming during pregnancy, diagnosis and management of GDM	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE

II	20 (T) 15 (L) 80 (C)	• Identify, provide initial management and refer women with problems during labour within the scope of midwifery practice.	**Recognition and management of abnormal labour** • Preterm labour – Prevention and management of preterm labour; (Use of antenatal corticosteroids in preterm labour) • Premature rupture of membranes • Malposition's and abnormal presentations (posterior position, breech, brow, face, shoulder) • Contracted Pelvis, Cephalo Pelvic Disproportion (CPD) • Disorders of uterine action – Prolonged labour, Precipitate labour, Dysfunctional labour • Complications of third stage – Retained placenta, Injuries to birth canal, Postpartum hemorrhage (bimanual compression of the uterus, aortic compression, uterine balloon tamponade) • Obstetric emergencies – Foetal distress, Ruptured uterus, Cord prolapse, Shoulder dystocia, Uterine inversion, Vasa previa, Obstetrical shock, Amniotic fluid embolism • Episiotomy and suturing • Obstetric procedures – Forceps delivery, Vacuum delivery, Version • Induction of labour – Medical & surgical • Caesarean section – indications and preparation • Nursing management of women undergoing • Obstetric operations and procedures • Drugs used in management of abnormal labour • Anesthesia and analgesia in obstetrics	• Lecture • Discussion • Demonstration • Case discussion/ presentation • Simulation • Role play • Drug presentation • Supervised clinical practice • WHO midwifery toolkit • GoI guidelines – use of uterotonics during labour, antenatal corticosteroids • GoI guidance note on prevention and management of PPH	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE
III	9 (T) 5 (L) 40 (C)	Describe the assessment, initial management, referral and nursing care of women with abnormal postnatal conditions.	**Recognition and Management of postnatal problems** • Physical examination, identification of deviation from normal • Puerperal complications and its management • Puerperal pyrexia • Puerperal sepsis • Urinary complications • Secondary Postpartum hemorrhage • Vulval hematoma • Breast engorgement including mastitis/breast abscess, feeding problem • Thrombophlebitis	• Lecture • Demonstration • Case discussion/ presentation • Drug presentation • Supervised clinical practice	• Quiz • Simulation • Short answer • OSCE

			• DVT • Uterine sub involution • Vesico vaginal fistula (VVF), Recto vaginal fistula (RVF) • Postpartum depression/psychosis • Drugs used in abnormal puerperium • Policy about referral		
IV	7 (T) 5 (L) 40 (C)	Describe high risk neonates and their nursing management	**Assessment and management of High- risk newborn (Review)** • Models of newborn care in India – NBCC; SNCUs • Screening of high-risk newborn • Protocols, levels of neonatal care, infection control • Prematurity, Post-maturity • Low birth weight • Kangaroo Mother Care • Birth asphyxia/Hypoxic encephalopathy • Neonatal sepsis • Hypothermia • Respiratory distress • Jaundice • Neonatal infections • High fever • Convulsions • Neonatal tetanus • Congenital anomalies • Baby of HIV positive mothers • Baby of Rh-negative mothers • Birth injuries • SIDS (Sudden Infant Death Syndrome) prevention, Compassionate care • Calculation of fluid requirements, EBM/formula feeds/tube feeding • Home based newborn care program community facility integration in newborn care • Decision making about management and referral • Bereavement counseling • Drugs used for high risk newborns • Maintenance of records and reports	• Lecture • Discussion • Demonstration • Simulation • Case discussion/ presentation • Drug presentation • Supervised Clinical practice • Integrated Management of Neonatal Childhood Illnesses (IMNCI)	• Short answer • Objective type • Assessment of skills with check list • OSCE

V	12 (T) 5 (L) 80 (C)	Describe the assessment and management of women with gynecological disorders.	**Assessment and management of women with gynecological disorders** • Gynecological assessment – History and Physical assessment • Breast Self-Examination • Congenital abnormalities of female reproductive system • Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and management of women with • Menstrual abnormalities • Abnormal uterine bleed • Pelvic inflammatory disease • Infections of the reproductive tract • Uterine displacement • Endometriosis • Uterine and cervical fibroids and polyps • Tumors – uterine, cervical, ovarian, vaginal, vulval • Cysts – ovarian, vulval • Cystocele, urethrocele, rectocele • Genitor-urinary fistulas • Breast disorders – infections, deformities, cysts, tumors • HPV vaccination • Disorders of Puberty and menopause • Hormonal replacement therapy • Assessment and management of couples with infertility • Infertility – definition, causes • Counseling the infertile couple • Investigations – male and female • Artificial reproductive technology • Surrogacy, sperm and ovum donation, cryopreservation • Adoption – counseling, procedures • Injuries and Trauma; Sexual violence • Drugs used in treatment of gynaecological disorders	• Lecture • Discussion • Demonstration • Case discussion/ presentation • Drug presentation • Videos, films • Simulated practice • Supervised Clinical practice • Visit to infertility clinic and ART centers	• Essay • Short answer • Objective type • Assessment of skills with check list • OSCE

Note: Complete safe delivery app during VII Semester.

PRACTICUM

SKILL LAB & CLINICAL ARE GIVEN UNDER OBG NURSING – I

LIST OF APPENDICES

APPENDIX 01

LIST OF MANDATORY MODULES

SL NO.	MODULE
01	FIRST AID MODULE (Nursing Foundation I)
02	HEALTH ASSESSMENT MODULE (Nursing Foundation II)
03	BLS/BCLS MODULE (Adult Health Nursing I)
04	FUNDAMENTALS OF PRESCRIBING MODULE (Pharmacology II)
05	PALLIATIVE CARE MODULE
06	FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) MODULES (Child Health Nursing I)
07	IMNCI MODULE (Child Health Nursing I)
08	PLS MODULE (Child Health Nursing I)
09	SBA MODULE & SAFE DELIVERY APP MODULE (Midwifery/Obstetrics & Gynaecology Nursing I & II)

FIRST AID MODULE (Nursing Foundation I)

PLACEMENT: I SEMESTER

Theory: 20 hours

Practical: 20 hours

Module Overview: This module covers various basic first aid techniques including basic CPR and common emergencies. It further aims to train students to develop first aid competencies to deal with specific emergencies to preserve life.

Competencies (Learning Outcomes): The student will be able to

1. Explain basic principles of first aid and law related to first aid.
2. Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.
3. Identify common emergencies that require immediate attention and first aid.
4. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.
5. Perform first aid measures such as dressings, bandages, and safe transportation.
6. Prepare first aid kit.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Role play
- Mock drill
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type): 20 marks
- Assignments: 10 marks
- OSCE (First aid competencies): 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Explanatory Note:

{Weightage to Internal Assessment: 10 marks taken out of 50 marks mentioned above have to be added to 30 marks of continuous assessment of Nursing Foundation I to make up the total of 40 marks.

Final 40/4 = 10 marks of continuous assessment to be added to 15 marks from sessional exams to make up the total internal assessment marks of 25}.

CONTENT OUTLINE

T-Theory, Practical-P

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	T-2	Explain basic principles of first aid and law related to first aid.	**First Aid:** • Introduction • Aims • First aid and law • **General Principles:** ○ Safety ○ Seeking help ○ Quick assessment • Observation - consciousness and breathing ○ Provision of first aid	• Lecture cum discussion • Role play	• MCQ • Short answers
II	T-5 P-6	Describe various first aid techniques such as basic CPR, recovery position, top to toe assessment and hygiene and handwashing.	**First aid techniques** • Basic CPR - Adult & baby/ child • Securing open airway • Recovery position • Initial top-to-toe assessment • Hygiene & Handwashing technique	• Lecture cum discussion • Demonstration • Practice in skill lab/Simulation lab	• Short answers • OSCE

III	T-8 P-8	Identify common emergencies that require immediate attention and first aid. Perform basic first aid techniques to deal with specific and common emergencies to preserve life.	**First aid management of Common emergencies** • Review of anatomy & physiology of systems mentioned below. • **Respiratory system:** ○ Drowning ○ Strangulation & hanging ○ Choking ○ Suffocation by smoke ○ Asthma • **CVS** ○ Chest discomfort/pain ○ Bleeding ○ Shock • **Injury & fractures** ○ Head, neck & spinal injuries ○ Injuries & fractures to bones, joints, and muscles ○ Dislocations ○ Strains & Sprains ○ Immobilization techniques • **Unconsciousness & Nervous system related emergencies** ○ Unconsciousness ○ Stroke ○ Convulsions, epilepsy • **GI & Endo system related emergencies** ○ Diarrhea ○ Food poisoning ○ Diabetes • **Skin, burns, heat exhaustion, fever & hypothermia** ○ Burns ○ Heat stroke ○ Fever ○ Hypothermia • **Poisoning** • **Bites & stings** ○ Animal bites, insect stings & bites ○ Snake bites • **Sensory system related** ○ Foreign bodies in eye, ear, nose, or skin	• Self-study, Review & written assignment • Lecture cum discussion • Demonstration • Role play • Practice in skill lab/clinical • Mock drill	• Case study • Written Assignment • OSCE

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
			oSwallowed foreign objects • **Urinary system, reproductive system, and emergency childbirth** • **Psychological first aid** • **Emergency situations and disaster management**		
IV	T-4 P-6	Demonstrate competency in performing first aid measures such as dressings, bandages, and safe transportation	**Selected First Aid Techniques** • Dressing • Bandaging • Transportation	• Demonstration • Practice	• OSCE
V	T-1	Describe first aid kit	**First Aid Kit** • Content of first aid box - small, medium, and large • First medical responder first aid kit	• Display & discussion	• Short answers • Observation Report

Learning Resources: (Latest version to be consulted as and when revised)

- Indian First aid manual by IRCS (Seventh edition, 2016)
- Standard first aid training course outline (IRCS, 2019)
- Subsequent and latest revisions must be consulted and used by teachers and students.
- FAST mobile app prepared by NDMA & IRCS may also be used.

HEALTH ASSESSMENT MODULE (Nursing Foundation II)

PLACEMENT: II SEMESTER

Theory: 20 hours

Practical-Skill Lab: 20 hours

Module Overview: This module covers methods of health assessment, nursing health history, comprehensive physical assessment and guide to perform physical assessment.

Competencies (Learning Outcomes): The student will be able to

1. Identify the purposes of the physical examination.
2. Describe the preparation for health assessment.
3. Explain the four methods/techniques used in physical examination: inspection, palpation, percussion, and auscultation.
4. Perform comprehensive health assessment that includes nursing health history and system wise physical examination.
5. Identify expected findings during health assessment.

Learning Activities:

- Lectures
- Demonstration
- Practice in Skill/Simulation Lab
- Case study method (case scenario and questions)
- Self-study/Reading assignments
- Written assignments

Assessment Methods:

- Test paper - Objective type/Short answers - 20 marks
- Assignments - 10 marks
- OSCE-20 (Nursing Health history, System wise physical assessment, Comprehensive physical assessment and identification of abnormal findings)

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4 P-4	Identify The Purposes of the Physical Examination and Describe the Preparation for Health Assessment. Explain the Four Methods/ Techniques used in Health Assessment:	**Health Assessment** • Definition/Meaning • Purposes • Preparation for Health Assessment • Methods of Health Assessment ○ Inspection, ○ Palpation, ○ Percussion, and ○ Auscultation.	• Lecture • Demonstration • Practice in Skill Lab and Clinical	• MCQ • Short answers • OSCE
II	T-8 P-8	Perform Comprehensive Health Assessment that includes Nursing Health History and System Wise Physical Examination.	**Comprehensive Health Assessment** • Nursing Health History • *Physical Assessment* • Comprehensive Physical Examination - System Wise	• Self-Study Review of Anatomy of System and Organs • Lecture • Demonstration • Practice in Skill Lab and Clinical	• Short answers • Written assignments • OSCE
III	T-8 P-8	Identify Expected Findings during Health Assessment	**Guide To Perform Head-to-Toe Physical Assessment to identify Normal/Abnormal Findings** Assessment Techniques and Normal Findings	• Lecture cum discussion • Demonstration • Practice in Skill Lab And Clinical Identification of Findings	• Short answers • Written assignments OSCE

Learning Resource:

Health Assessment Module prepared by INC, given below.

HEALTH ASSESSMENT MODULE (Nursing Foundation II)

S.No.	Content
1	**INTRODUCTION**
	Purposes of health assessment
	Preparation for health assessment
	Methods of health assessment
2	**A. COMPREHENSIVE HEALTH ASSESSMENT**
	I. Nursing Health History
	II. Physical Assessment
	1. Assessment of mental status, anthropometric measurements and vital signs
	2. Assessment of the integumentary system
	3. Assessment of head and neck
	4. Assessment of breast and axillae
	5. Assessment of respiratory system - thorax & lungs
	6. Assessment of cardiovascular system - Heart
	7. Assessment of abdomen
	8. Assessment of male and female genitalia
	9. Assessment of rectum and anus
	10. Assessment of musculoskeletal system
	11. Assessment of peripheral vascular system
	12. Assessment of neurological system
3	**B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT**
	1. Integumentary system
	2. Head and Neck
	3. Anterior & Posterior thorax (Breast & axillae, thorax, lungs, heart)
	4. Abdomen
	5. Male and female genitalia
	6. Rectum and anus
	7. Extremities (Musculoskeletal system & Peripheral vascular system)
	8. Neurological system
4	Annexure 1: Terminology relevant to Neurological system
5	Annexure 2: Sample Health Assessment Format (Adult)

HEALTH ASSESSMENT

INTRODUCTION

Health assessment is the evaluation of the health status by performing a physical examination after taking a health history. Successful assessment requires a practical understanding of what is involved, the time and resources necessary to undertake assessment, and sufficient integration of findings into planning and implementation of treatment and care.

Purposes of Health Assessment

- To identify the patient's response to health and illness
- To determine the nursing care needs of the patient
- To evaluate outcomes of health care and patient progress
- To screen for presence of risk factors.

Preparation for Health Assessment (infection control, preparation of equipment, environment and patient)

- *Infection control*
  - Use standard precautions as appropriate
  - Use personal protective equipment (gloves, mask, etc.)
  - Perform hand hygiene
- Utilize clean instruments.
- *Preparation of environment*
- Ensure adequate lighting is available
  - Use sound proof room or minimize noise
  - Use special examination tables as needed
  - Provide ideal room temperature
  - Ensure adequate privacy (curtains)
- Provide safety and prevent falls.
- *Preparation of equipment*
- Collect and arrange all equipment for easy access
  - Check functioning of all equipment (change batteries if needed)
  - Warm equipment before use, if required
  - Equipment usually collected are Sphygmomanometer, stethoscope, thermometer, cotton balls, tongue depressor, reflex hammer, swab stick, k-basin, tuning fork, etc.

Preparation of the patient

- *Physical preparation of the patient*
  - Ensure physical comfort
  - Position patient as required
  - Dress and drape patient appropriately
  - Keep patient warm
  - Assist patient to restroom prior to examination and collect samples (urine/stool) if required.
- *Psychological preparation of the patient*
- Explain the procedure and its need to the patient. Clarify doubts to reduce anxiety
  - Maintain a calm, open and professional approach
  - Provide chaperone when the patient is of the opposite gender of the nurse
  - Look for verbal and non-verbal cues to identify patient's discomfort and stop or postpone the examination if needed.

Methods of Physical Assessment

1. *Inspection:* It is the use of vision and hearing to detect normal and abnormal findings. Adequate lighting should be ensured with paying attention to detail. The same area on the opposite side should be compared whenever applicable. Inspection is done to assess moisture, color, and texture of body surface as well as shape, position, size, and symmetry of the body parts.

2. *Palpation:* It is the use of the hands and the sense of touch to gather data. The pads of the fingers are used. Different parts of the hand are best suited for specific purposes. For example, the dorsal aspect of the hand is best for assessing temperature changes. Hand hygiene is to be ensured.

   Types of palpation: Light palpation (<1 cm), Moderate palpation (1-2 cm) & Deep palpation (2 cm) and Bimanual Palpation & palpation with single hand.

   The purpose is to assess the texture, temperature, tenderness, moisture, size, distention, pulsation, and mobility of organs or masses

3. *Percussion:* It means tapping of various body organs and structures to produce vibration and sound. It is the act of striking the body surface to elicit sounds that can be heard or vibration that can be felt.

   Types of percussion: Direct percussion and Indirect (use of plexor & pleximeter) percussion.

   The purpose is to determine the location, size and density of underlying tissue structures and if tissue is fluid filled, air filled or solid.

   Sounds heard: Flatness (muscle or bone), dullness (organs), resonance (lungs filled with air), hyper resonance (emphysematous lung), tympany (air filled stomach).

4. *Auscultation:* The act of listening to sounds within the body to evaluate the condition of body organs (stethoscope) can be performed with unaided ear or stethoscope. Sounds are described according to their
   a. Pitch: The frequency of the vibrations (ranging from high to low)
   b. Intensity: The loudness or softness of a sound
   c. Duration: The sound length (short, medium, or long)
   d. Quality: Subjective description of sounds (gurgling, swishing)

5. *Olfaction:* It is the use of sense of smell to perceive and differentiate odors.

Example: Acetone breath in Diabetic Keto Acidosis

A. COMPREHENSIVE HEALTH ASSESSMENT

A comprehensive health assessment includes:

I. Nursing Health History

- A general survey - Demographic data, Physical environmental history, Biological environmental history
- Health history - Family and Personal health history
- A complete medical history-past and present medical history

II. Physical Assessment

1. General appearance, mental status, anthropometric measurements and vital signs

General appearance and mental status: Physical assessment begins with observation of the patient's general appearance, level of comfort, and mental status.

Anthropometric measurements: Measurement of height, weight and BMI follows next.

Vital signs: The pulse, blood pressure, bodily temperature and respiratory rate are measured and documented.

2. Assessment of the Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

3. Assessment of the Head& Neck (The Face and Skull, Eyes, Ears, Nose, Mouth, Throat, Neck)

3.1 Face and Skull

Inspection: The size, shape and symmetry of the face and skull, facial movements and symmetry are inspected.

Palpation: The presence of any lumps, soreness, and masses are assessed.

3.2 Eyes

Inspection: Pupils in reference to their bilateral equality, reaction to light and accommodation, the presence of any discharge, irritation, redness and abnormal eye movement are assessed.

Standardized Testing: The Snellen chart for visual acuity

3.3 Ears

Inspection: The auricles are inspected in terms of color, symmetry, elasticity and any tenderness or lesions; the external ear canal is inspected for color and the presence of any drainage and ear wax; and the tympanic membrane in terms of color, integrity and the lack of any bulging is also assessed.

Standardized Testing: The Rinne test and the Weber test for the assessment of hearing can be done using a tuning fork.

3.4 Nose

Inspection: The color, size, shape, symmetry, and any presence of drainage, flaring, tenderness, and masses are assessed; the nasal passages are assessed visually using an otoscope of the correct size for an infant, child and adult; the sense of smell is also assessed.

Palpation: The sinuses are assessed for any signs of tenderness and infection.

3.5 Mouth and Throat

Inspection: The lips are visualized for their symmetry and color; the buccal membranes, the gums and the tongue are inspected for color, any lesions and their level of dryness or moisture; the tongue is inspected for symmetry of movement; teeth are inspected for the presence of any loose or missing teeth; the uvula is assessed for movement, position, size and color; the salivary glands are examined for signs of inflammation or redness; the oropharynx, tonsils, hard and soft palates are also inspected for color, redness and any lesions. Lastly, the gag reflex is assessed. The mouth and the throat are assessed using a tongue blade and a light source.

3.6 Neck

Inspection: The neck and head movement is visualized; the thyroid gland is inspected for any swelling and also for normal movement during swallowing.

Palpation: The neck, the lymph nodes, and trachea are palpated for size and any irregularities.

4. Assessment of the Breast and Axillae

Inspection: The breasts are visualized to assess the size, shape, symmetry, color and the presence of any dimpling, lesions, swelling, edema, visible lumps and nipple retractions. The nipples are also assessed for the presence of any discharge, which is not normal for either gender except when the female is pregnant or lactating.

Palpation: The nurse performs a complete breast examination using the finger tips to determine if any lumps are felt. The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

5. Assessment of Respiratory System (Thorax and Lungs)

5.1 Assessment of the Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to assess normal and abnormal sounds over the thorax

5.2 Assessment of the Lungs

Auscultation: The assessment of normal and adventitious breath sounds.

Percussion: It is done to identify for normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

6. Assessment of the Cardiovascular System (Heart)

Inspection: Pulsations indicating the possibility of an aortic aneurysm are identified by inspection.

Auscultation: Listening to systolic heart sounds like the normal S_1 heart sound and abnormal clicks, the diastolic heart sounds of S_2, S_3, S_4, diastolic knocks and mitral valve sounds, all of which are abnormal with the exception of S_2 which can be normal among patients less than 40 years of age.

7. Assessment of the Abdomen

Inspection: The abdomen is visualized to determine its size, contour, symmetry and the presence of any lesions. As previously mentioned, the abdomen is also inspected to determine the presence of any pulsations that could indicate the possible presence of an abdominal aortic aneurysm.

Auscultation: The bowel sounds are assessed in all four quadrants which are the upper right quadrant, the upper left quadrant, the lower right quadrant and the lower left quadrant.

Palpation: Light palpation, which is then followed with deep palpation, is done to assess for the presence of any masses, tenderness, and pain, guarding and rebound tenderness.

8. Assessment of the Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female patients. The penis, urethral meatus, and the scrotum are inspected among male patients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male patients.

9. Assessment of the Rectum and Anus

Inspection: The rectum, anus and the surrounding area are examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

10. Assessment of the Musculoskeletal System

Inspection: The major muscles of the body are inspected by the nurse to determine their size, and strength, and the presence of any tremors, contractures, muscular weakness and/or paralysis. All joints are assessed for their full range of motion. The areas around the bones and the major muscle groups are also inspected to determine any areas of deformity, swelling and/or tenderness.

Palpation: The muscles are palpated to determine the presence of any spasticity, flaccidity, pain, tenderness, and tremors.

11. Assessment of the Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

12. Assessment of the Neurological System

Of all of the bodily systems that are assessed, the neurological system is perhaps the most extensive and complex.

The neurological system is assessed with:

Inspection

Balance, gait, gross motor function, fine motor function and coordination, sensory functioning, temperature sensory functioning, kinesthetic sensations and tactile sensory motor functioning, as well as all of the cranial nerves are assessed.

Some of the terms and terminology relating to the neurological system and neurological system disorders are given in **Annexure 1.**

B. GUIDE IN PERFORMING A HEAD-TO-TOE PHYSICAL ASSESSMENT

1. Integumentary System (Hair, Skin and Nails)

Inspection: The color of the skin, the quality, distribution and condition of the bodily hair, the size, the location, color and type of any skin lesions are assessed and documented, the color of the nail beds, and the angle of curvature where the nails meet the skin of the fingers are also inspected.

Palpation: The temperature, level of moisture, turgor and the presence or absence of any edema or swelling on the skin are assessed.

2. Head & Neck (Skull, Scalp, Hair, Face, Eyes, Ears, Nose, Mouth, Throat, Neck)

- Observe the size, shape and contour of the skull.
- Observe scalp in several areas by separating the hair at various locations; inquire about any injuries. Note presence of lice, nits, dandruff or lesions.
- Palpate the head by running the pads of the fingers over the entire surface of skull; inquire about tenderness upon doing so. (wear gloves if necessary)
- Observe and feel the hair condition.

Normal Findings:

2.1 Skull

- Generally round, with prominences in the frontal and occipital area (Normocephalic).
- No tenderness noted upon palpation.

2.2 Scalp

- Lighter in color than the complexion.
- Can be moist or oily.
- No scars noted.
- Free from lice, nits and dandruff.
- No lesions should be noted.
- No tenderness or masses on palpation.

2.3 Hair

- Can be black, brown or blonde depending on the race.
- Evenly distributed, covers the whole scalp.
- No evidences of Alopecia.
- Maybe thick or thin, coarse or smooth.
- Neither brittle nor dry.

2.4 Face

- Observe the face for shape.
- Inspect for Symmetry.
  - Inspect for the palpebral fissure (distance between the eye lids of each eye); should be equal in both eyes.
  - Ask the patient to smile, There should be bilateral Nasolabial fold (creases extending from the angle of the corner of the mouth). Slight asymmetry in the fold is normal.
  - If both are met, then the Face is symmetrical
- Test the functioning of Cranial Nerves that innervates the facial structures

2.5 Eyes

Eyebrows, Eyes and Eyelashes

- All three structures are assessed using the modality of inspection.

Normal findings

Eyebrows

- Symmetrical and in line with each other.
- Maybe black, brown or blond depending on race.
- Evenly distributed.

Severe exophthalmos

Eyes

- Evenly placed and in line with each other.
- None protruding.
- Equal palpebral fissure.

Eyelashes

- Color dependent on race.
- Evenly distributed.
- Turned outward.

Eyelids and Lacrimal Apparatus

- Inspect the eyelids for position and symmetry.
- Palpate the eyelids for the lacrimal glands.
  - To examine the lacrimal gland, the examiner, lightly slides the pad of the index finger against the client's upper orbital rim.
  - Inquire for any pain or tenderness.
- Palpate for the nasolacrimal duct to check for obstruction.
  - To assess the nasolacrimal duct, the examiner presses with the index finger against the client's lower inner orbital rim, at the lacrimal sac, **NOT AGAINST THE NOSE.**
  - In the presence of blockage, this will cause regurgitation of fluid in the puncta

Normal Findings

Eyelids

- Upper eyelids cover the small portion of the iris, cornea, and sclera when eyes are open.
- No PTOSIS noted. (Drooping of upper eyelids).
- Meets completely when eyes are closed.
- Symmetrical.

Lacrimal Apparatus

- Lacrimal gland is normally non-palpable.
- No tenderness on palpation.
- No regurgitation from the nasolacrimal duct.

Conjunctivae

- The bulbar and palpebral conjunctivae are examined by separating the eyelids widely and having the

client look up, down and to each side. When separating the lids, the examiner should exert NO PRESSURE against the eyeball; rather, the examiner should hold the lids against the ridges of the bony orbit surrounding the eye.

In examining the palpebral conjunctiva, everting the upper eyelid in necessary and is done as follow:

1. Ask the client to look down but keep his eyes slightly open. This relaxes the levator muscles, whereas closing the eyes contracts the orbicularis muscle, preventing lid eversion.
2. Gently grasp the upper eyelashes and pull gently downward. Do not pull the lashes outward or upward; this, too, causes muscles contraction.
3. Place a cotton tip application about 1cm above the lid margin and push gently downward with the applicator while still holding the lashes. This everts the lid.
4. Hold the lashes of the everted lid against the upper ridge of the bony orbit, just beneath the eyebrow, never pushing against the eyeball.
5. Examine the lid for swelling, infection, and presence of foreign objects.
6. To return the lid to its normal position, move the lid slightly forward and ask the client to look up and to blink. The lid returns easily to its normal position.

Normal Findings

- Both conjunctivae are pinkish or red in color.
- With presence of many minute capillaries.
- Moist
- No ulcers
- No foreign objects

Sclerae

- The sclerae is easily inspected during the assessment of the conjunctivae.

Normal Findings

- Sclerae is white in color (anicteric sclera)
- No yellowish discoloration (icteric sclera).
- Some capillaries maybe visible.
- Some people may have pigmented sclera.

Cornea

- The cornea is best inspected by directing penlight obliquely from several positions.

Normal findings

- There should be no irregularities on the surface.
- Looks smooth.
- The cornea is clear or transparent. The features of the iris should be fully visible through the cornea.
- There is a positive corneal reflex.

Anterior Chamber and Iris

- The anterior chamber and the iris are easily inspected in conjunction with the cornea. The technique of oblique illumination is also useful in assessing the anterior chamber.

Normal Findings

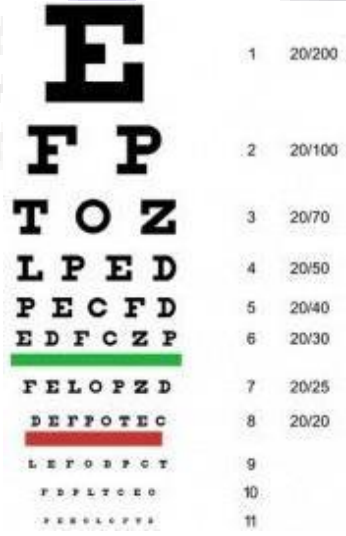
- The anterior chamber is transparent.
- No noted ~~any~~ visible materials.
- Color of the iris depends on the person's race (black, blue, brown or green).
- From the side view, the iris should appear flat and should not be bulging forward. There should be NO crescent shadow casted on the other side when illuminated from one side.

Pupils

- Examination of the pupils involves several inspections, including assessment of the size, shape reaction to light is directed is observed for direct response of constriction. Simultaneously, the other eye is observed for consensual response of constriction.
- The test for papillary accommodation is the examination for the change in pupillary size as it is switched from a distant to a near object.
- Ask the client to stare at the objects across room.
- Then ask the client to fix his gaze on the examiner's index fingers, which is placed 5 inches from the client's nose.
- Visualization of distant objects normally causes pupillary dilation and visualization of nearer objects causes pupillary constriction and convergence of the eye.

Normal Findings

- Pupillary size ranges from 3-7 mm, and are equal in size.
- Equally round.
- Constrict briskly/sluggishly when light is directed to the eye, both directly and consensual.
- Pupils dilate when looking at distant objects, and constrict when looking at nearer objects.
- If all of which are met, we document the findings using the notation PERRLA, pupils equally round, reactive to light, and accommodation.



A Snellen chart

- The optic nerve (Cranial Nerve II) is assessed by testing for visual acuity and peripheral vision.
- Visual acuity is tested using a Snellen chart, for those who are illiterate and unfamiliar with the western alphabet, the illiterate E chart, in which the letter E faces in different directions, maybe used.
- The chart has a standardized number at the end of each line of letters; these numbers indicates the degree of visual acuity when measured at a distance of 20 feet.

- The numerator 20 is the distance in feet between the chart and the client, or the standard testing distance. The denominator 20 is the distance from which the normal eye can read the lettering, which correspond to the number at the end of each letter line; therefore the larger the denominator the poorer the version.
- Measurement of 20/20 vision is an indication of either refractive error or some other optic disorder.
- In testing for visual acuity you may refer to the following:
  - The room used for this test should be well lighted.
  - A person who wears corrective lenses should be tested with and without them to check for the adequacy of correction.
  - Only one eye should be tested at a time; the other eye should be covered by an opaque card or eye cover, not with client's finger.
  - Make the client read the chart by pointing at a letter randomly at each line; maybe started from largest to smallest or vice versa.
  - A person who can read the largest letter on the chart (20/200) should be checked if they can perceive hand movement about 12 inches from their eyes, or if they can perceive the light of the penlight directed to their yes.

Peripheral vision or visual fields

- The assessment of visual acuity is indicative of the functioning of the macular area, the area of central vision. However, it does not test the sensitivity of the other areas of the retina which perceive the more peripheral stimuli. The Visual field confrontation test, provide a rather gross measurement of peripheral vision.
- The performance of this test assumes that the examiner has normal visual fields, since that client's visual fields are to be compared with the examiners.

Follow the steps on conducting the test:

- The examiner and the client sit or stand opposite each other, with the eyes at the same, horizontal level with the distance of 1.5 – 2 feet apart.
- The client covers the eye with opaque card, and the examiner covers the eye that is opposite to the client covered eye.
- Instruct the client to stare directly at the examiner's eye, while the examiner stares at the client's open eye. Neither looks out at the object approaching from the periphery.
- The examiner holds an object such as pencil or penlight, in his hand and gradually moves it in from the periphery of both directions horizontally and from above and below.
- Normally the client should see the same time the examiners sees it. The normal visual field is 180 degrees.

2.6 Ears

- Inspect the auricles of the ears for parallelism, size position, appearance and skin color.
- Palpate the auricles and the mastoid process for firmness of the cartilage of the auricles, tenderness when manipulating the auricles and the mastoid process.
- Inspect the auditory meatus or the ear canal for color, presence of cerumen, discharges, and foreign bodies.
- For adult pull the pinna upward and backward to straighten the canal.
- For children pull the pinna downward and backward to straighten the canal
- Perform otoscopic examination of the tympanic membrane, noting the color and landmarks.

Normal Findings

- The ear lobes are bean shaped, parallel, and symmetrical.
- The upper connection of the ear lobe is parallel with the outer canthus of the eye.
- Skin is same in color as in the complexion.
- No lesions noted on inspection.
- The auricles are has a firm cartilage on palpation.
- The pinna recoils when folded.
- There is no pain or tenderness on the palpation of the auricles and mastoid process.
- The ear canal has normally some cerumen of inspection.
- No discharges or lesions noted at the ear canal.
- On otoscopic examination the tympanic membrane appears flat, translucent and pearly gray in color.

2.7 Nose and Paranasal Sinuses

- The external portion of the nose is inspected for the following:
  - Placement and symmetry.
  - Patency of nares (done by occluding a nostril one at a time, and noting for difficulty in breathing)

- Flaring of alae nasi
- Discharge

- The external nares are palpated for:
  - Displacement of bone and cartilage.
  - For tenderness and masses
  - The internal nares are inspected by hyper extending the neck of the client, the ulnar aspect of the examiners hard over the fore head of the client, and using the thumb to push the tip of the nose upward while shining a light into the nares.

- Inspect for the following:
  - Position of the septum.
  - Check septum for perforation. (Can also be checked by directing the lighted penlight on the side of the nose, illumination at the other side suggests perforation).
  - The nasal mucosa (turbinates) for swelling, exudates and change in color.

Paranasal Sinuses

- Examination of the paranasal sinuses is indirectly. Information about their condition is gained by inspection and palpation of the overlying tissues. Only frontal and maxillary sinuses are accessible for examination.
- By palpating both cheeks simultaneously, one can determine tenderness of the maxillary sinusitis, and pressing the thumb just below the eyebrows, we can determine tenderness of the frontal sinuses.

Normal Findings

- Nose in the midline
- No Discharges.
- No flaring alae nasi.
- Both nares are patent.
- No bone and cartilage deviation noted on palpation.
- No tenderness noted on palpation.
- Nasal septum in the mid line and not perforated.
- The nasal mucosa is pinkish to red in color. (Increased redness turbinates are typical of allergy).
- No tenderness noted on palpation of the paranasal sinuses.

2.8 Mouth and Oropharynx, Lips

Inspected for:

- Symmetry and surface abnormalities
- Color
- Edema

Normal Findings

- With visible margin
- Symmetrical in appearance and movement
- Pinkish in color
- No edema

Temporomandibular Joint

- Palpate while the mouth is opened wide and then closed for:
  - Crepitus
  - Deviations
  - Tenderness

Normal Findings

- Moves smoothly no crepitus.
- No deviations noted
- No pain or tenderness on palpation and jaw movement.

Gums Inspected for:

- Color
- Bleeding
- Retraction of gums.

Normal Findings

- Pinkish in color
- No gum bleeding
- No receding gums

Teeth

Inspected for:

- Number
- Color
- Dental carries
- Dental fillings
- Alignment and malocclusions (2 teeth in the space for 1, or overlapping teeth)
- Tooth loss
- Breath should also be assessed during the process.

Normal Findings

- 28 for children and 32 for adults.
- White to yellowish in color
- With or without dental carries and/or dental fillings.
- With or without malocclusions.
- No halitosis.

Tongue

Palpated for:

- Texture

Normal Findings

- Pinkish with white taste buds on the surface.
- No lesions noted.
- No varicosities on ventral surface.
- Frenulum is thin attaches to the posterior 1/3 of the ventral aspect of the tongue.
- Gag reflex is present.
- Able to move the tongue freely and with strength.
- Surface of the tongue is rough.

Uvula

Inspected for:

- Position
- Color
- Cranial Nerve X (Vagus nerve) - Tested by asking the client to say “Ah” note that the uvula will move upward and forward.

Normal Findings

- Positioned in the mid line.
- Pinkish to red in color.
- No swelling or lesion noted.
- Moves upward and backwards when asked to say “ah”

Throat

Tonsils

Inspected for:

- Inflammation
- Size
- A Grading system used to describe the size of the tonsils can be used.
  - Grade 1 – Tonsils behind the pillar.
  - Grade 2 – Between pillar and uvula.
  - Grade 3 – Touching the uvula
  - Grade 4 – In the midline.

2.9 Neck

- The neck is inspected for position symmetry and obvious lumps visibility of the thyroid gland and Jugular Venous Distension
- Check the Range of Movement of the neck.

Normal Findings

- The neck is straight.
- No visible mass or lumps.
- Symmetrical
- No jugular venous distension (suggestive of cardiac congestion).
- The neck is palpated just above the suprasternal note using the thumb and the index finger.

Normal Findings

- The trachea is palpable.
- It is positioned in the line and straight.
- Lymph nodes are palpated using palmar tips of the fingers via systemic circular movements. Describe lymph nodes in terms of size, regularity, consistency, tenderness and fixation to surrounding tissues.

Normal Findings

- May not be palpable. Maybe normally palpable in thin patients.
- Non tender if palpable.
- Firm with smooth rounded surface.
- Slightly movable.
- About less than 1 cm in size.
- The thyroid is initially observed by standing in front of the patient and asking the patient to swallow. Palpation of the thyroid can be done either by posterior or anterior approach.

Posterior Approach:

1. Let the patient sit on a chair while the examiner stands behind him.
2. In examining the isthmus of the thyroid, locate the cricoid cartilage and directly below that is the isthmus.
3. Ask the patient to swallow while feeling for any enlargement of the thyroid isthmus.
4. To facilitate examination of each lobe, the client is asked to turn his head slightly toward the side to be examined to displace the sternocleidomastoid, while the other hand of the examiner pushes the thyroid cartilage towards the side of the thyroid lobe to be examined.
5. Ask the patient to swallow as the procedure is being done.
6. The examiner may also palpate for thyroid enlargement by placing the thumb deep to and behind the sternocleidomastoid muscle, while the index and middle fingers are placed deep to and in front of the muscle.
7. Then the procedure is repeated on the other side.

Anterior approach:

1. The examiner stands in front of the patient and with the palmar surface of the middle and index fingers palpates below the cricoid cartilage.
2. Ask the patient to swallow while palpation is being done.
3. In palpating the lobes of the thyroid, similar procedure is done as in posterior approach. The patient is asked to turn his head slightly to one side and then the other of the lobe to be examined.
4. Again the examiner displaces the thyroid cartilage towards the side of the lobe to be examined.

5. Again, the examiner palpates the area and hooks thumb and fingers around the sternocleidomastoid muscle.

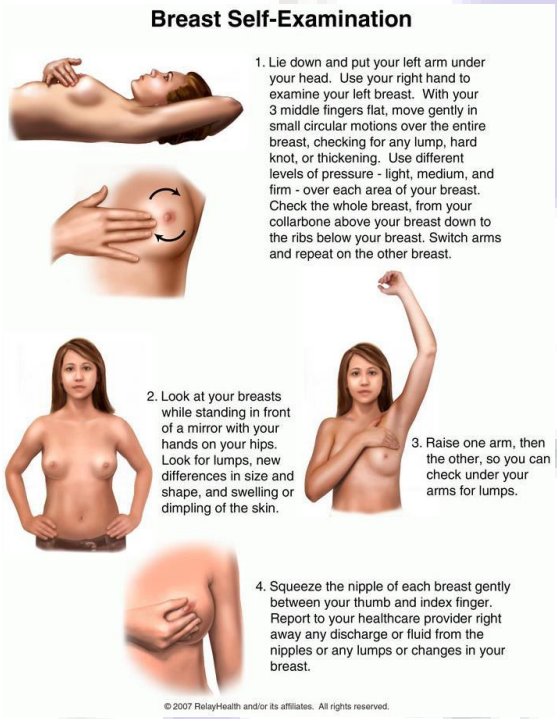
Normal Findings

- Normally the thyroid is non palpable.
- Isthmus maybe visible in a thin neck.
- No nodules are palpable.
- Auscultation of the Thyroid is necessary when there is thyroid enlargement. The examiner may hear bruits, as a result of increased and turbulence in blood flow in an enlarged thyroid.

3. Anterior and Posterior Thorax (Breast & Axillae, Thorax, Lungs and Heart)

3.1 Breast and Axilla

Breast



Inspection of the Breast

- There are 4 major sitting position of the client used for clinical breast examination. Every patient should be examined in each position.
  - The patient is seated with her arms on her side
  - The patient is seated with her arms abducted over the head.
  - The patient is seated and is pushing her hands into her hips, simultaneously eliciting contraction of the pectoral muscles.
  - The patient is seated and is learning over while the examiner assists in supporting and balancing her.
- While the patient is performing these manoeuvres, the breasts are carefully observed for symmetry, bulging, retraction, and fixation.
- An abnormality may not be apparent in the breasts at rest a mass may cause the breasts, through invasion of the suspensory ligaments, to fix, preventing them from upward movement in position 2 and 4.
- Position 3 specifically assists in eliciting dimpling if a mass has infiltrated and shortened suspensory ligaments.

Normal Findings

- The overlying the breast should be even.
- May or may not be completely symmetrical at rest.
- The areola is rounded or oval, with same color, (Color varies form light pink to dark brown depending on race).
- Nipples are rounded, everted, same size and equal in color.
- No “orange peel” skin is noted which is present in edema.
- The veins maybe visible but not engorge and prominent.

- No obvious mass noted.
- Not fixated and moves bilaterally when hands are abducted over the head, or is learning forward.
- No retractions or dimpling.

Palpation of the Breast

- Palpate the breast along imaginary concentric circles, following a clockwise rotary motion, from the periphery to the center going to the nipples. Be sure that the breast is adequately surveyed. Breast examination is best done 1 week post menses.
- Each areolar areas are carefully palpated to determine the presence of underlying masses.
- Each nipple is gently compressed to assess for the presence of masses or discharge.

Normal Findings

- No lumps or masses are palpable.
- No tenderness upon palpation.
- No discharges from the nipples.
- NOTE: The male breasts are observed by adapting the techniques used for female clients. However, the various sitting position used for woman is unnecessary.

Axillae

The lymph nodes in the axillary areas are also palpated for any enlargement or swelling.

3.2 Thorax

Inspection: The anterior and posterior thorax is inspected for size, symmetry, shape and for the presence of any skin lesions and/or misalignment of the spine; chest movements are observed for the normal movement of the diaphragm during respirations.

Palpation: The posterior thorax is assessed for respiratory excursion and fremitus.

Percussion: It is done to identify normal and abnormal sounds over the thorax.

3.3 Lungs

Auscultation: The assessment of normal and adventitious breath sounds is done by auscultation.

Percussion: It is done to assess normal and abnormal sounds. Normal breath sounds like vesicular breath sounds, bronchial breath sounds, bronchovesicular breath sounds are auscultated and assessed in the same manner that adventitious breath sounds like rales, wheezes, friction rubs, rhonchi, and abnormal bronchophony, egophony, and whispered pectoriloquy are auscultated, assessed and documented.

3.4 Heart

Inspection of the Heart

- The chest wall and epigastrium is inspected while the client is in supine position. Observe for pulsation and heaves or lifts

Normal Findings

- Pulsation of the apical impulse maybe visible. (this can give us some indication of the cardiac size).
- There should be no lift or heaves.

Palpation of the Heart

- The entire precordium is palpated methodically using the palms and the fingers, beginning at the apex, moving to the left sternal border, and then to the base of the heart.

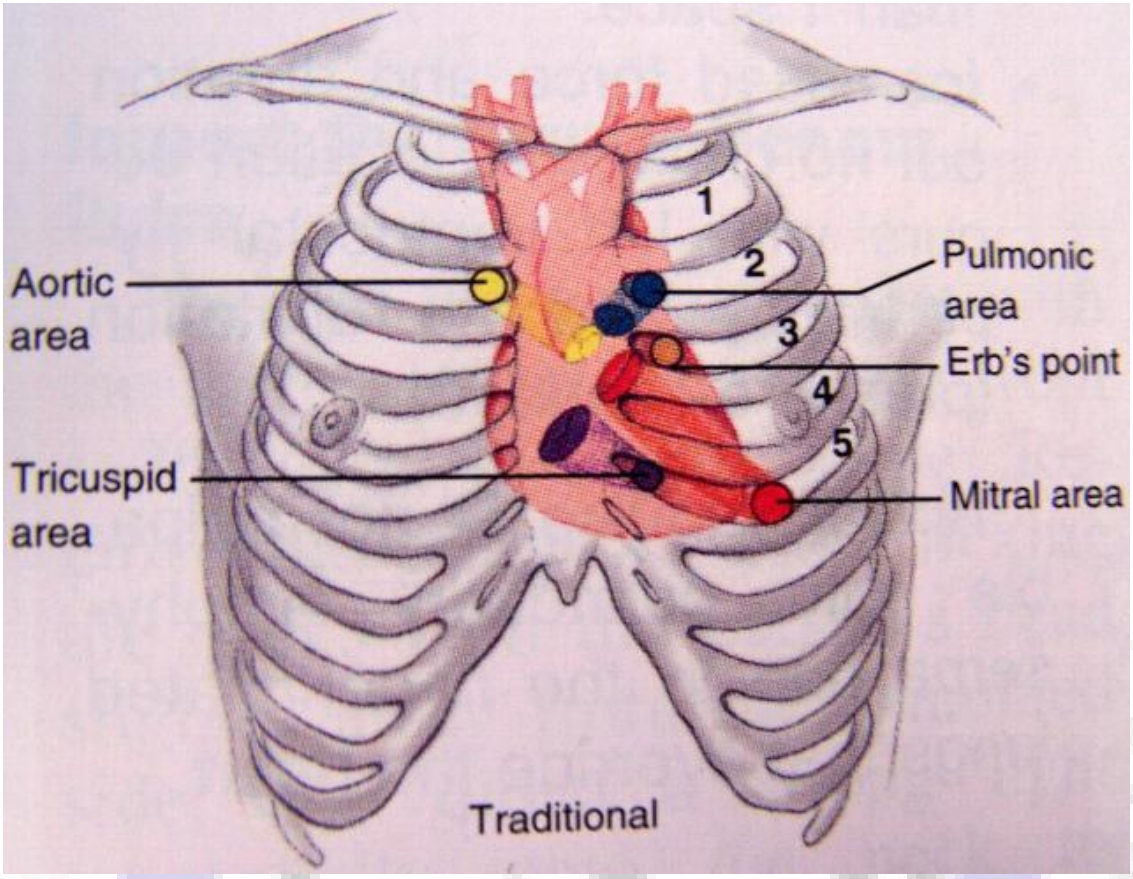
Normal Findings

- No, palpable pulsation over the aortic, pulmonic, and mitral valves.
- Apical pulsation can be felt on palpation.
- There should be no noted abnormal heaves, and thrills felt over the apex.

Percussion of the Heart

- The technique of percussion is of limited value in cardiac assessment. It can be used to determine borders of cardiac dullness.

Auscultation of the Heart



- Anatomic areas for auscultation of the heart:
  - Aortic valve – Right 2nd ICS sternal border.
  - Pulmonic Valve – Left 2nd ICS sternal border.
  - Tricuspid Valve – Left 5th ICS sternal border.
  - Mitral Valve – Left 5th ICS midclavicular line

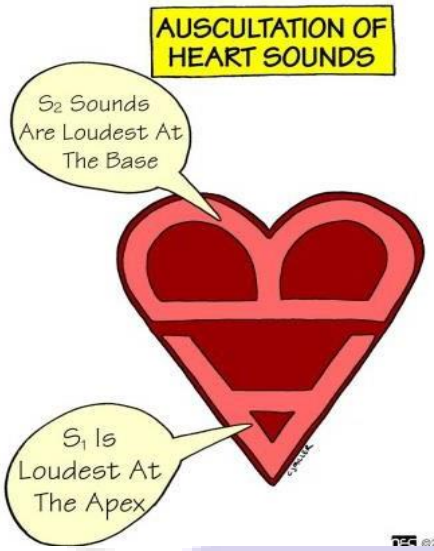
Positioning the patient for auscultation:

1. If the heart sounds are faint or undetectable, try listening to them with the patient seated and learning forward, or lying on his left side, which brings the heart closer to the surface of the chest.
2. Having the patient seated and learning forward s best suited for hearing high-pitched sounds related to semilunar valves problem.
3. The left lateral recumbent position is best suited low-pitched sounds, such as mitral valve problems and extra heart sounds.

Auscultating the heart:

1. Auscultate the heart in all anatomic areas aortic, pulmonic, tricuspid and mitral
2. Listen for the S1 and S2 sounds (S1 closure of AV valves; S2 closure of semilunar valve). S1 sound is best heard over the mitral valve; S2 is best heard over the aortric valve.
3. Listen for abnormal heart sounds e.g. S3, S4, and Murmurs.
4. Count heart rate at the apical pulse for one full minute.

Auscultation of Heart Sounds



Normal Findings

- S1 & S2 can be heard at all anatomic site.
- No abnormal heart sounds is heard (e.g. Murmurs, S3 & S4).
- Cardiac rate ranges from 60-100 bpm.

4. Abdomen

In abdominal assessment, be sure that the client has emptied the bladder for comfort. Place the client in a supine position with the knees slightly flexed to relax abdominal muscles.

Inspection of the abdomen

- Inspect for skin integrity (Pigmentation, lesions, striae, scars, veins, and umbilicus).
- Contour (flat, rounded, scapold)
- Distension
- Respiratory movement
- Visible peristalsis
- Pulsations

Normal Findings

- Skin color is uniform, no lesions.
- Some patients may have striae or scar.
- No venous engorgement.
- Contour may be flat, rounded or scaphoid
- Thin patients may have visible peristalsis.
- Aortic pulsation maybe visible on thin clients.

Auscultation of the Abdomen

- This method precedes percussion because bowel motility, and thus bowel sounds, may be increased by palpation or percussion.
- The stethoscope and the hands should be warmed; if they are cold, they may initiate contraction of the abdominal muscles.
- Light pressure on the stethoscope is sufficient to detect bowel sounds and bruits. Intestinal sounds are relatively high-pitched; the bell may be used in exploring arterial murmurs and venous hum.

Peristaltic sounds

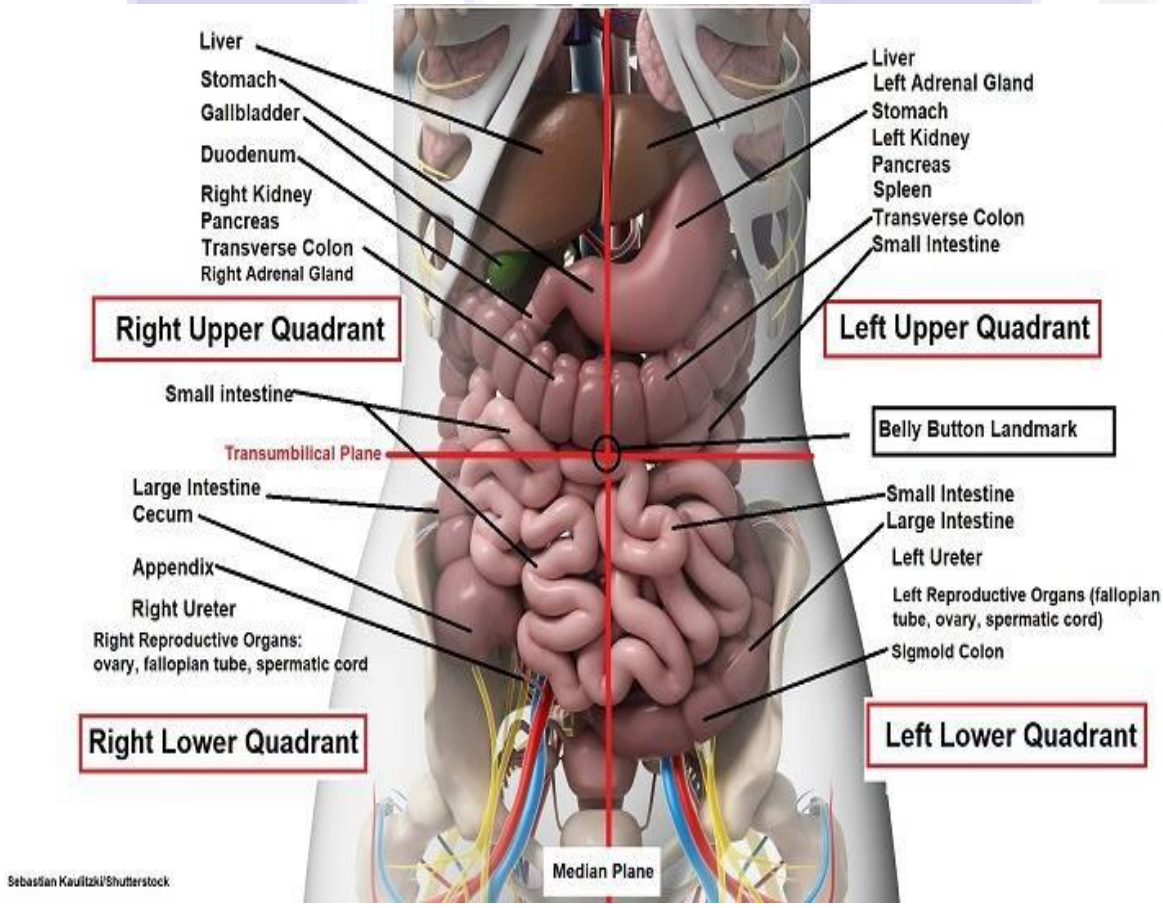
- These sounds are produced by the movements of air and fluids through the gastrointestinal tract. Peristalsis can provide diagnostic clues relevant to the motility of bowel.
- Listening to the bowel sounds (borborygmi) can be facilitated by following these steps:

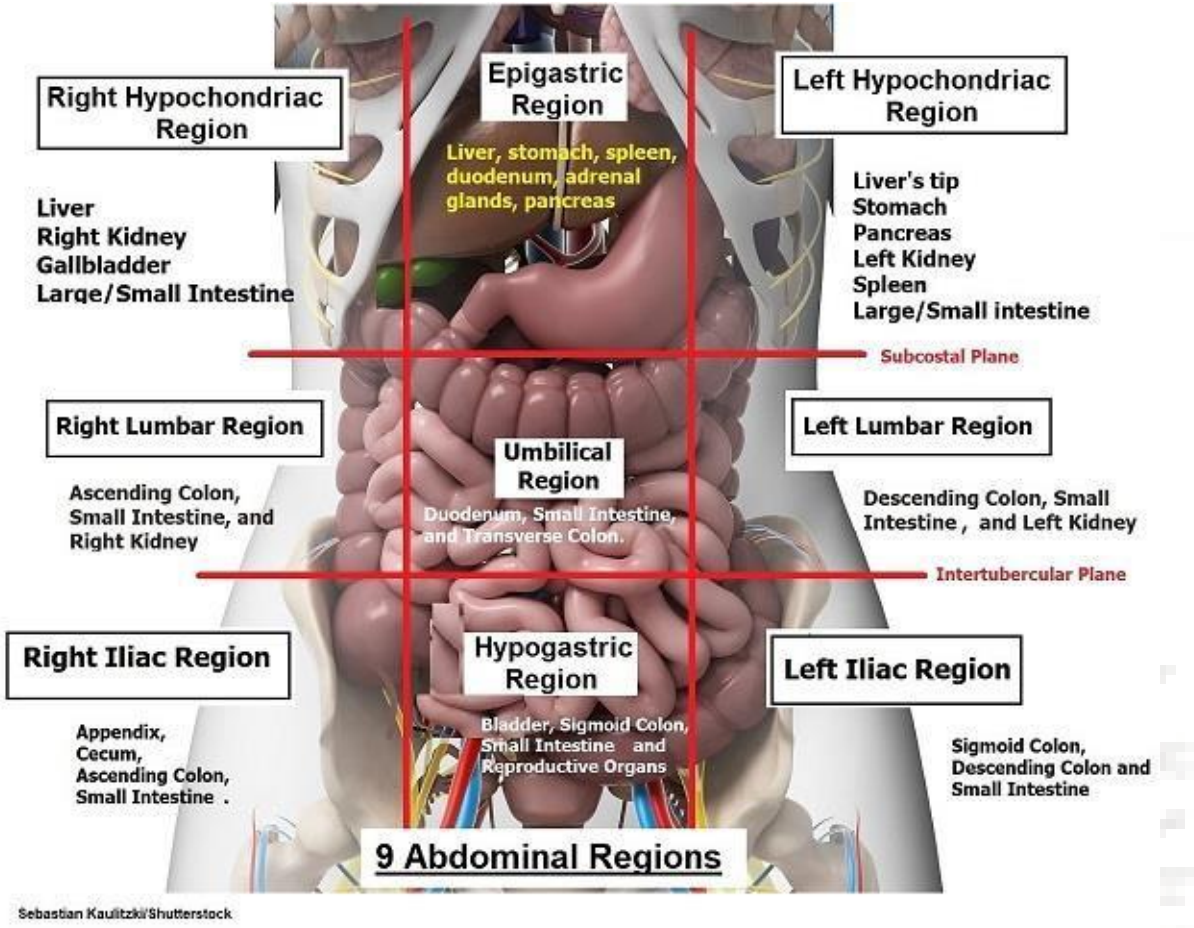
- Divide the abdomen in four quadrants.
- Listen over all auscultation sites, starting at the right lower quadrants, following the cross pattern of the imaginary lines in creating the abdominal quadrants. This direction ensures that we follow the direction of bowel movement.
- Peristaltic sounds are quite irregular. Thus it is recommended that the examiner listen for at least 5 minutes, especially at the periumbilical area, before concluding that no bowel sounds are present.
- The normal bowel sounds are high-pitched, gurgling noises that occur approximately every 5 – 15 seconds. It is suggested that the number of bowel sound may be as low as 3 to as high as 20 per minute, or roughly, one bowel sound for each breath sound.
- Some factors that affect bowel sound:
  - Presence of food in the GI tract.
  - State of digestion.
  - Pathologic conditions of the bowel (inflammation, Gangrene, paralytic ileus, peritonitis).
  - Bowel surgery
  - Constipation or Diarrhoea.
  - Electrolyte imbalances.
  - Bowel obstruction.

Percussion of the abdomen

- Abdominal percussion is aimed at detecting fluid in the peritoneum (ascites), gaseous distension, and masses, and in assessing solid structures within the abdomen.
- The direction of abdominal percussion follows the auscultation site at each abdominal guardant as detailed below.

The abdomen can be divided into four quadrants or nine regions as follows.





- The entire abdomen should be percussed lightly or a general picture of the areas of tympani and dullness.
- Tympany will predominate because of the presence of gas in the small and large bowel. Solid masses will percuss as dull, such as liver in the RUQ, spleen at the 6th or 9th rib just posterior to or at the mid axillary line on the left side.
- Percussion in the abdomen can also be used in assessing the liver span and size of the spleen.

Percussion of the liver

- The palms of the left hand are placed over the region of liver dullness.
- The area is striked lightly with a fisted right hand.
- Normally tenderness should not be elicited by this method.
- Tenderness elicited by this method is usually a result of hepatitis or cholecystitis.

Renal Percussion

- Can be done by either indirect or direct method.
- Percussion is done over the costovertebral junction.
- Tenderness elicited by such method suggests renal inflammation.

Palpation of the Abdomen Light

palpation

- It is a gentle exploration performed while the client is in supine position. With the examiner's hands parallel to the floor.
- The fingers depress the abdominal wall, at each quadrant, by approximately 1 cm without digging, but gently palpating with slow circular motion.
- This method is used for eliciting slight tenderness, large masses, and muscles, and muscle guarding.
- Tensing of abdominal musculature may occur because of:
  - The examiner's hands are too cold or are pressed to vigorously or deep into the abdomen.
  - The client is ticklish or guards involuntarily.
  - Presence of subjacent pathologic condition.

Normal Findings

- No tenderness noted.
- With smooth and consistent tension.
- No muscles guarding.

*Deep Palpation

It is the indentation of the abdomen performed by pressing the distal half of the palmar surfaces of the fingers into the abdominal wall.

- The abdominal wall may slide back and forth while the fingers move back and forth over the organ being examined.
- Deeper structures, like the liver, and retro peritoneal organs, like the kidneys, or masses may be felt with this method.
- In the absence of disease, pressure produced by deep palpation may produce tenderness over the cecum, the sigmoid colon, and the aorta.

Liver palpation

- There are two types of bi manual palpation recommended for palpation of the liver. The first one is the superimposition of the right hand over the left hand.
  - Ask the patient to take 3 normal breaths.
  - Then ask the client to breathe deeply and hold. This would push the liver down to facilitate palpation.
  - Press hand deeply over the RUQ
- The second methods:
  - The examiner's left hand is placed beneath the client at the level of the right 11th and 12th ribs.
  - Place the examiner's right hands parallel to the costal margin or the RUQ.
  - An upward pressure is placed beneath the client to push the liver towards the examining right hand, while the right hand is pressing into the abdominal wall.
  - Ask the client to breathe deeply.
  - As the client inspires, the liver maybe felt to slip beneath the examining fingers.

*Percussion and Palpation of deep structures such as liver and kidneys to be done under supervision

Normal Findings

- The liver usually cannot be palpated in a normal adult. However, in extremely thin but otherwise well individuals, it may be felt the coastal margins.
- When the normal liver margin is palpated, it must be smooth, regular in contour, firm and non-tender.

5. Male and Female Genitalia

Inspection: The skin and the pubic hair are inspected. The labia, clitoris, vagina and urethral opening are inspected among female clients. The penis, urethral meatus, and the scrotum are inspected among male clients.

Palpation: The inguinal lymph nodes are palpated for the presence of any tenderness, swelling or enlargements. A testicular examination is done for male clients.

6. Rectum and Anus

Inspection: The rectum, anus and the surrounding area is examined for any abnormalities.

Palpation: With a gloved hand, the rectal sphincter is palpated for muscular tone, and the presence of any blood, tenderness, pain or nodules.

7. Extremities (Musculoskeletal system& Peripheral Vascular System)

Inspection

- Observe for size, contour, bilateral symmetry, and involuntary movement.
- Look for gross deformities, edema, presence of trauma such as ecchymosis or other discoloration.
- Always compare both extremities.

Palpation

- Feel for evenness of temperature. Normally it should be even for all the extremities.
- Tonicity of muscle. (Can be measured by asking client to squeeze examiner's fingers and noting for equality of contraction).
- Perform range of motion.
- Test for muscle strength (performed against gravity and against resistance and described in the table below:

Table showing the Lovett scale for grading for muscle strength and functional level

Grade	Muscle function level	Lovett Scale
0	0% of normal strength	0 (Zero)
1	10% of normal strength; no movement, contraction of muscle is palpable or visible	T (Trace)
2	25% of normal strength; full muscle movement against gravity	P (Poor)
3	50% of normal strength; normal movement against gravity	F (Fair)
4	75% of normal strength; normal movement against gravity and against minimal resistance	G (Good)
5	100% of normal strength; normal movement against gravity and against minimal resistance	N (Normal)

Normal Findings

- Both extremities are equal in size.
- Have the same contour with prominences of joints.
- No involuntary movements.
- No edema
- Color is even.
- Temperature is warm and even.
- Has equal contraction and even.
- Can perform complete range of motion.
- No crepitus must be noted on joints.
- Can counter act gravity and resistance on ROM.

Peripheral Vascular System

Inspection: The extremities are inspected for any abnormal color and any signs of poor perfusion to the extremities, particularly the lower extremities. While the patient is in a supine position, the nurse also assesses the jugular veins for any bulging pulsations or distention.

Auscultation: The nurse assesses the carotids for the presence of any abnormal bruits.

Palpation: The peripheral veins are gently touched to determine the temperature of the skin, the presence of any tenderness and swelling.

The peripheral vein pulses are also palpated bilaterally to determine regularity, number of beats, volume and bilateral equality in terms of these characteristics.

8. Neurological system

Neurological assessment **-** mental status includes level of consciousness (LOC), orientation, and memory.

Balance is assessed using the relatively simple Romberg test. The Romberg test is the test that law enforcement use to test people for drunkenness. Gait can be assessed by simply observing the client as they are walking or by coaching the person to walk heal to toe as the nurse observes the client for their gait.

Gross motor functioning is bilaterally assessed by having the client contract their muscles; and fine motor coordination and functioning is observed for both the upper and the lower extremities as the client manipulates objects.

Sensory functioning is determined by touching various parts of the body, bilaterally, with a pen or another blunt item while the client has their eyes closed. The client is prompted to report whether or not they feel the blunt item as the nurse touches the area. Similarly, a hot and cold object is placed on the skin on various parts of the body to assess temperature sensory functioning. The client will then report whether they feel heat, cold or nothing at all.

Kinesthetic sensations are assessed to determine the client's ability to perceive and report their bodily positioning without the help of visual cues.

Tactile sensory functioning is assessed for the client's ability to have stereognosis, extinction, one point discrimination and two point discrimination. One and two point discrimination relates to the client's ability to feel whether or not they have gotten one or two pin pricks that the nurse gently applies. Stereognosis is the

client's ability to feel and identify a familiar object while their eyes are closed. For example, the nurse may place a pen, a button or a paper clip in the client's hand to determine whether or not the client can identify the object without any visual cues. Extinction is the client's ability to identify whether or not they are being touched by the person doing the assessment with either one or two bilateral touches. For example, the nurse may touch both knees and then ask the client if they felt one or two touches while the client has their eyes closed.

8.1 Reflexes

Reflexes are automatic muscular responses to a stimulus. When reflexes are absent or otherwise altered, it can indicate a neurological deficit even earlier than other signs and symptoms of the neurological deficitappear.

Reflexes can be described as primitive and long term. Primitive reflexes are normally present at the time of birth and these reflexes normally disappear as the baby grows older; neurological deficits are suspected when these primitive reflexes remain beyond the point in time when they are expected to disappear. Reflexes, other than the primitive reflexes remain intact and active during the entire life span, under normal conditions.

Deep Tendon and Superficial Reflexes

A **deep tendon reflex** is often associated with muscle stretching. **Tendon reflex** tests are used to determine the integrity of the spinal cord and peripheral nervous system, and they can be used to determine the presence of a neuromuscular disease.

Superficial reflexes. **Superficial reflexes** are motor responses to scraping of the skin. They are graded simply as present or absent, although markedly asymmetrical responses should be considered abnormal as well

- **Pupil reflex:** Pupil reflexes include pupil dilation and pupil accommodation. The "PERLA" mnemonic for pupil reflexes stands for Pupils Equally Reactive to Light and Accommodation which is a normal finding. The pupil reflexes for their reactions to light are assessed by using a flash light in a darkened room. Pupils will normally dilate as the light is withdrawn and they will normally constrict when the light is brought close to the pupils. The pupils are assessed not only for their reaction to light, they are also assessed in terms of their accommodation. Normally, the pupils will dilate when an object is moved away from the eye and they will constrict as the object is being brought closer to the eye.
- **Plantar reflex:** The plantar reflex is elicited when the person performing this assessment strokes the bottom of the foot and the client's toes curl down. The Babinski sign occurs when the foot goes into dorsiflexion and the great toe curls up; this sign is an abnormal response to this stimulation and it can indicate the presence of deep vein thrombosis.
- **Biceps reflex:** This reflex is assessed by placing the thumb on the biceps tendon while the person is in a sitting position and then tapping the thumb with the Taylor hammer.
- **Triceps reflex:** This reflex is elicited by tapping the triceps tendon with the Taylor hammer above the elbow while the client has their hands on their legs when the client is in a sitting position.
- **Patellar tendon reflex:** This reflex, often referred to as the knee jerk reflex, is elicited by tapping the patellar area with the Taylor hammer.
- **Calcaneal reflex:** This reflex, often referred to as the Achilles reflex, isthe calcaneal reflex on the ankle with the Taylor hammer.
- **Gag reflex:** The gag reflex is elicited when the back of the mouth and the posterior tongue is stimulated with a tongue blade.
- **Blinking reflex:** This reflex is elicited when the eyes are touched or they are stimulated a sudden bright light or an irritant.
- An **abdominal reflex** is a superficial neurological **reflex** stimulated by stroking of the **abdomen** around the umbilicus. It can be helpful in determining the level of a CNS lesion.

All reflexes should be done bilaterally in rapid succession so that all differences between the right and the left reflexes can be determined and assessed. For example, when the person who is performing these assessments should assess the biceps reflex of the right arm and then immediately assess the biceps reflex of the left arm so that any differences or inequalities can be assessed and documented.

Reflexes

- Deep Tendon Reflexes (DTR)
  - Biceps (C5-C6)
  - Triceps (C7-C8)
  - Brachioradialis (C5-C6)
  - Quadriceps (Patellar) (L2-L4)
  - Achilles (L5-S2)
- Superficial Reflexes
  - Plantar Reflex/Babinski (L4-S2)
  - Abdominal Reflexes (Upper T8-T10) (Lower T10-T12)
  - Crematic Reflex (L1-L2)

Documenting Reflex Findings

Use these grading scales to rate the strength of each reflex in a deep tendon and superficial reflex assessment.

Deep tendon reflex grades

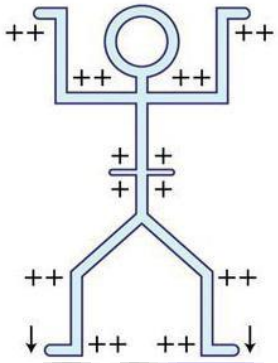
0 absent
+ present but diminished
+ + normal
+ + + increased but not necessarily pathologic
+ + + + hyperactive or clonic (involuntary contraction and relaxation of skeletal muscle)

Superficial reflex grades

0 absent
+ present

Use the patient's reflex ratings on a drawing of a stick figure. The figures here show documentation of normal and abnormal reflex responses.

Normal



8.2 Cranial nerves:

Lastly, the nurse assesses the twelve cranial nerves. Some of these twelve cranial nerves are only sensory or motor nerves, and others have both sensory and motor functions.

The twelve cranial nerves can be easily remembered using this mnemonic: On Old Olympus Tippy Top, A Fat Armed German View A Hop, as below:

1. Olfactory
2. Optic
3. Oculomotor
4. Trochlear
5. Trigeminal
6. Abducens
7. Facial
8. Acoustic
9. Glossopharyngeal
10. Vagus
11. Spinal accessory
12. Hypoglossal

Each of these twelve cranial nerves, their function and their classification as sensory, motor or both sensory and motor are shown in the table below.

Cranial Nerve I (Olfactory Nerve)

- To test the adequacy of function of the olfactory nerve:
  - The client is asked to close his eyes and occlude.
  - The examiner places aromatic and easily distinguished items nose (e.g. alcohol, vinegar, coffee).
  - Ask the client to identify the odor.
  - Each side is tested separately (**There is no need to use two different substances)**

Cranial Nerve II (Optic Nerve)

The optic nerve is assessed by testing for visual acuity and peripheral vision. **(Details shown in examination of eyes)**

Cranial Nerve III, IV & VI (Oculomotor, Trochlear, Abducens)

- All the 3 Cranial nerves are tested at the same time by assessing the Extra Ocular Movement (EOM) or the six cardinal position of gaze.

Follow the given steps:

- Stand directly in front of the client and hold a finger or a penlight about 1 ft from the client's eyes.
- Instruct the client to follow the direction the object hold by the examiner by eye movements only; that is without moving the neck.
- The nurse moves the object in a clockwise direction hexagonally.
- Instruct the client to fix his gaze momentarily on the extreme position in each of the six cardinal gazes.
- The examiner should watch for any jerky movements of the eye (nystagmus).
- Normally the client can hold the position and there should be no nystagmus.

Cranial Nerve V (Trigeminal) - While performing the cranial nerves assessment, the respective cranial nerve assessment can be incorporated in the respective systems.

1. **Sensory Function**
   - Ask the patient to close the eyes.
   - Run cotton wisp over the fore head, check and jaw on both sides of the face.
   - Ask the patient if he/she feel it, and where it is felt.
   - Check for corneal reflex using cotton wisp.
   - The normal response is blinking.
2. Motor function
   - Ask the patient to chew or clench the jaw. Palpate the jaw and feel for movement.
   - The patient should be able to clench or chew with strength and force.

Cranial Nerve VII (Facial)

1. Sensory function (This nerve innervates the anterior 2/3 of the tongue).
   - Place a sweet, sour, salty, or bitter substance near the tip of the tongue.
   - Normally, the client can identify the taste.
2. Motor function
   - Ask the patient to smile, frown, raise eye brow, close eye lids, whistle, or puff the cheeks.

Normal Findings

- Shape maybe oval or rounded.
- Face is symmetrical.
- No involuntary muscle movements.
- Can move facial muscles at will.
- Intact cranial nerve V and VII.

The summary table is given below:

Cranial Nerve		Major Functions		Assessment
Cranial Nerve I	Olfactory	Sensory	Smell	Smell—coffee, cloves, peppermint
Cranial Nerve II	Optic	Sensory	Vision	Visual acuity—Snellen chart (cover eye not being examined) Test for visual fields Examine with ophthalmoscope
Cranial Nerve III	Oculomotor	Sensory and Motor – Primarily Motor	Eyelid and eyeball movement	Move eye up, down, and peripherally Test for accommodation Pupillary constriction Observe for ptosis of upper eyelid
Cranial Nerve IV	Trochlear	Sensory and Motor – Primarily Motor	Innervates superior oblique eye muscle Turns eye downward and laterally	Inferior lateral movement of the eye
Cranial Nerve V	Trigeminal	Sensory and Motor	Chewing Face and mouth touch and pain	Corneal reflex Sensation of skin of the face (eyebrow, cheeks and chin) by using a wisp of cotton Chewing, biting, lateral jaw movements (move jaw side to side)
Cranial Nerve VI	Abducens	Sensory and Motor – Primarily Motor	Turns eye laterally Proprioception (sensory awareness of part of the body)	Inferior lateral eye movements
Cranial Nerve VII	Facial	Sensory and Motor	Controls most facial expressions Secretion of ears and saliva	Taste—anterior two thirds of tongue; sweet—sugar; salty; sour—lemon; bitter (rinse mouth between applications) Movement of forehead and mouth Raise eyebrows, show teeth, smile, and puff out cheeks
Cranial Nerve VIII	Vestibulocochlear (auditory)	Sensory	Hearing Equilibrium sensation	Hearing, balance Weber and Rinne tests Otoscope
Cranial Nerve IX	Glossopharyngeal	Sensory and Motor	Taste Senses carotid blood pressure Muscle sense – proprioception, sensory awareness of the body	Swallowing and phonation Taste—posterior one third of tongue; see cranial nerve VII
Cranial Nerve X	Vagus	Sensory and Motor	Senses aortic blood pressure Slows heart rate Stimulates digestive organs Taste	Sensations of posterior one third of tongue, throat. Gag reflex (stimulate back of pharynx with a tongue blade) Swallowing and phonation
Cranial Nerve XI	Spinal Accessory	Sensory and Motor – Primarily Motor	Controls trapezius and sternocleidomastoid controls swallowing movements Muscle sense - proprioception	Shoulder movement, shoulder shrug, head rotation—push against examiner's hand
Cranial Nerve XII	Hypoglossal	Sensory and Motor – Primarily Motor	Controls tongue movements Muscle sense - proprioception	Tongue movement—protrude tongue, push tongue into the cheek

(Berman, Snyder, Kozier & Erb, 2008; Jarvis, 2008).

Glasgow Coma Scale:

The **Glasgow Coma Scale** (**GCS**) allows healthcare professionals to consistently evaluate the consciousness level of a patient. There are three aspects of behaviour that are independently measured as part of an **assessment** of a patient's **GCS** – motor responsiveness, verbal response and eye-opening.

Feature	Response	Score
Best eye response	Open spontaneously	4
	Open to verbal command	3
	Open to pain	2
	No eye opening	1
Best verbal response	Orientated	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No verbal response	1
Best motor response	Obeys commands	6
	Localising pain	5
	Withdrawal from pain	4
	Flexion to pain	3
	Extension to pain	2
	No motor response	1

Terms and terminology relating to the neurological system and neurological system disorders

Acalculia: Acalculia is the client's loss of ability to perform relatively simple mathematical calculations like addition and subtraction.

Agnosia: Agnosia is defined as the loss of a client's ability to recognize and identify familiar objects using the senses despite the fact that the senses are intact and normally functioning. The different types of agnosia, as based on each of the five senses, are auditory agnosia, visual agnosia, gustatory agnosia, olfactory agnosia, and tactile agnosia.

Agraphia: Agraphia, simply defined, is the Inability of the client to write. Agraphia is one of the four hallmark symptoms of Gerstmann's syndrome. The other symptoms of Gerstmann's syndrome are acalculia, finger agnosia, and an inability to differentiate between right and left.

Alexia: Alexia, which is a type of receptive aphasia, occurs when the client is unable to process, understand and read the written word. This neurological disorder is also referred to as word blindness and optical alexia.

Anhedonia: Anhedonia is a loss of interest in life experiences and life itself as the result of the neurological deficit.

Anomia: Anomia is a lack of ability of the client to name a familiar object or item.

Anosagnosia: Anosagnosia is characterized with the client's inability to perceive and have an awareness of an affected body part such as a paralyzed or missing leg. Anosagnosia is closely similar to hemineglect and hemiattention

Anosdiaphoria: Anosdiaphoria is an indifference to one's illness and disability

Aphasia: Aphasia includes expressive aphasia and receptive aphasia. Expressive aphasia is characterized by the client's inability to express their feelings and wishes to others with the spoken word; and receptive aphasia is the client's inability to understand the spoken words of others.

Asomatognosi: Asomatognosia is the inability of the client to recognize one or more of their own bodily parts.

Astereognosia: Astereognosia is the client's inability to differentiate among different textures with their sense of touch and also the inability of the client to identify a familiar object, like a button, with their tactile sensation.

Asymbolia: Asymbolia is the loss of the client's inability to respond to pain even though they have the sensory function to feel and perceive the pain. Asymbolia is also referred to as pain dissociation and pain asymbolia.

Autotopagnosia: Autotopagnosia is the inability of the client to locate their own body parts, the body parts of another person, or the body parts of a medical model.

Balint's syndrome: Balint's syndrome includes ocular apraxia, optic ataxia and simultanagnosia, which consist of impaired visual scanning, visusopatial ability and attention.

Boston Diagnostic Aphasia Examination: The Boston Diagnostic Aphasia Examination is a standardized comprehensive assessment tool that assess and measures the client's degree of aphasia in terms of the client's perceptions, processing of these perceptions and responses to these perceptions while using problem solving and comprehension skills.

Broca's aphasia: Broca's aphasia entails the client's lack of ability to form and express words even though the client's level of comprehension is intact.

Color agnosia: Color agnosia reflects the client's lack of ability to recognize and name different colors.

Conduction aphasia: Conduction aphasia is the client's lack of ability to repeat phrases and/or write brief dictated passages despite the fact that the client has intact speech abilities, comprehension abilities, and the ability to name familiar objects.

Constructional apraxia: Constructional apraxia is the inability of the client to draw and copy simple shapes on paper.

Dressing apraxia: Dressing apraxia occurs when the person is not able to appropriately dress oneself because of some neurological dysfunction.

Dysgraphaesthesia: Dysgraphaesthesia impairs the client's ability to sense and identify a letter or number that is tactily drawn on the client's palm.

Dysgraphia: Dysgraphia is similar to agraphia; however, dysgraphia is difficulty in terms of writing and agraphia is the client's complete inability to write.

Environmental agnosia: Environmental agnosia is the lack of ability of the client to recognize familiar places, like the US Supreme Court, by looking at a photograph of it.

Finger agnosia: Finger agnosia occurs when the person is not able to identify what finger is being touched by the person performing the neurological assessment.

Geographic agnosia: Geographic agnosia is the lack of ability of the client to recognize familiar counties, like Canada or Mexico, when viewing a world map.

Gerstmann's Syndrome: Gerstmann's Syndrome consists of dyscalculia or acalculia, finger agnosia, one sided disorientation and dysgraphia or agraphia.

Hemiasomatognosia: Hemiasomatognosia is the neurological disorder that occurs when the client does not perceive one half of their body and they act in a manner as if that half of the body does not even exist.

Homonymous hemianopsia: Homonymous hemianopsia occurs when the person has neurological blindness in the same visual field of both eyes bilaterally.

Ideomotor apraxia: Ideomotor apraxia is a neurological deficit that affects the client's ability to pretend doing simple tasks of everyday living like brushing one's teeth.

Misoplegia: Misoplegia is a hatred and distaste for an adversely affected limb.

Motor alexia: Motor alexia occurs when the client is not able to comprehend the written word despite the fact that the client can read it aloud.

Musical alexia: Musical alexia is a client's inability to recognize a familiar tune like "The National Anthem" or "Silent Night".

Movement agnosia: Movement agnosia is a neurological deficit that is characterized with a client's lack of ability to recognize an object's movement.

Ocular apraxia: Ocular apraxia is the neurological deficit that occurs when the person is no longer able to rapidly move their eyes to observe a moving object.

Optic ataxia: Optic ataxia is characterized with the client's inability to reach for and grab an object.

Phonagnosia: Phonagnosia is the client's lack of ability to recognize familiar voices such as those of a child or spouse.

Prosopagnosia: Prosopagnosia is a lack of ability to recognize familiar faces, like the face of a spouse or child.

Simultanagnosia: Simultanagnosia is a neurological disorder that occurs when the client is not able to perceive and process the perception of more than object at a time that is in the client's visual field.

Somatophrenia: Somatophrenia occurs when the client denies the fact that their body parts are not even theirs, but instead, these body parts belong to another.

The Two-Point Discrimination Test: This test measures and assesses the client's ability to recognize more than one sensory perception, such as pain and touch, at one time.

Visual agnosia: Visual agnosia is the client's lack of ability to recognize and attach meaning to familiar objects.

Wechsler Memory Scale IV: Wechsler Memory Scale IV: This measurement tool is a standardized comprehensive method to assess verbal and visual memory, including immediate memory, delayed memory, auditory memory, visual memory and visual working memory.

SAMPLE HEALTH ASSESSMENT FORMAT (Adult)

Date :

Place :

Patient's Name :

Hospital No. :

Age :

Sex :

Occupation :

Residence :

Chief Complaint :

History of present illness or problems:
History of Treatment :

Current Health status

Nutrition :
Elimination :

Sleep :

Immunizations :

Screening tests :

Allergies :

Medications :

Daily activities :

High risk behaviors :
- Alcohol
- Drug
- Cigarette usage
- Sexual behaviours

Past medical history

Illness :

Injuries :

Hospitalization/Surgeries

Family History:

Family profile & genogram Family

medical history Socio-

economic background

Physical Examination: Vital

signs

Temperature Pulse

Respiration

Blood Pressure

Height

Weight

BMI

General appearance Skin

and nails: Head and

face:

Eyes Ears

Nose

Mouth

Neck

Lymph nodes

Chest

Heart and CVS

Breast exam

Abdomen

Musculo skeletal system:

Neurological system

Motor functions Sensory

Cranial nerves Reflexes

BLS/BCLS MODULE (Adult Health Nursing I)

PLACEMENT: III SEMESTER

Theory: 4 hours (Includes self-learning & lectures)

Practical: 6 hours (Includes demonstration, practice & OSCE)

Module Overview: The Indian CPR guidelines/AHA guidelines can be used to get certification. The required hours can be used from theory and practical hours. The hours may vary based on certification guidelines.

Competencies: The student will be able to

1. Perform Basic Cardiopulmonary Life Support (BCLS) using the evidence based national or international guidelines in the management of adult victims with cardiac arrest.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (BCLS/BLS competencies) - 20 marks

OR

As per certification guidelines

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resource: (Latest version to be consulted as and when revised)

- Indian CPR/BCLS guidelines
- International guidelines and certification - AHA guidelines

FUNDAMENTALS OF PRESCRIBING MODULE (Pharmacology II)

PLACEMENT: IV SEMESTER

Theory: 20 hours (Few hours of practice can be planned in skill lab/simulation lab)

Module Overview: The module covers the prescriptive role of nurses particularly nurse practitioners, legal issues relevant to prescribing, and principles, process, and steps of prescribing. Further the students will be oriented to prescribing competencies.

Competencies (Learning Outcomes): The student will be able to

1. Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.
2. Discuss professional, legal, and ethical issues relevant to prescribing practice.
3. Enumerate the principles of prescribing and factors influencing it.
4. Explain the process and steps of prescribing.
5. Identify the prescribing competencies.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Prescribing competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	T-4	Identify the prescriptive role of nurses, midwives, and nurse practitioners at national and international levels.	**Introduction** • Background • Prescriptive role of nurses and nurse practitioners • Prescribing terminology	• Lecture • Discussion	• MCQ • Short answers
II	T-6	Discuss professional, legal, and ethical issues relevant to prescribing practice.	**Professional, legal, and ethical issues relevant to prescribing practice.** • Professional issues • Legal issues • Ethical issues	• Lecture • Discussion • Guided reading	• Short answers • Written assignments
III	T-4	Enumerate the principles of prescribing and factors influencing it.	**Principles of prescribing** • Principles • Factors influencing prescribing	• Lecture & discussion • Self-study & Guided reading	• Short answers

IV	T-6	Explain the process and steps of prescribing. Identify the prescribing competencies and develop basic prescribing competencies.	**Process of prescribing and competencies** • Steps of prescribing • Prescribing competencies	• Lecture & discussion • Review of Case studies Field Observation and skill lab practice	• Short answers • Observation report • OSCE

Learning Resource: Fundamentals of Prescribing Module prepared by INC, given below.

FUNDAMENTALS OF PRESCRIBING MODULE

PART I: Introduction and background

Prescribing is the main approach to the treatment and prevention of diseases in healthcare. Medicines are used more than any other intervention by patients to manage clinical conditions. The number and complexity of medicines are growing and prescribers are expected to develop and maintain prescribing competencies. When prescribed and used effectively, medicines have the potential to significantly improve patient outcomes. Doctors are the largest group of prescribers along with dentists who are able to prescribe on registration. The prescribing responsibilities have extended to other health professional groups who are able to prescribe within their scope of practice.

Countries such as USA, UK, and Australia utilize the non- medical prescribers namely nurses, pharmacists, podiatrists, and physiotherapists keeping the principle of effective use of resources, their skills and expertise maintaining safety and efficiency of prescribing. In these countries, nurse-prescribing courses with hands on experience by designated medical practitioner train nurses to perform independent and supplementary prescribing. Adequately trained nurse practitioners on completion of approved course/modules, prescribe from a limited nurse's drug formulary and function within the standards of proficiency for nurse prescribers.

In India, the current practice is that only medical practitioners and dentists prescribe drugs on registration. Prescribing is included as a component of their undergraduate program. Nursing roles are changing and with the introduction of nurse practitioner programs in critical care, midwifery and primary care, there is a need to move towards empowering these nurses in terms of quality, standards, monitoring and evaluation. Their clinical expertise is also highly valued by patients. With introduction of legal provision for nurse practitioners by INC standards, scope of practice and regulations alongside MOH&FW regulations, and support and acceptance by medical and pharmacy councils, NPs in India will be involved in prescribing within their scope soon. Currently INC in collaboration with MOH & FW have finalized Scope of Practice Document for Nurse Practitioners in midwifery and is placed in INC and Ministry's websites. This will enable NPMs to

prescribe within their scope as indicated.

PART II: The Prescriptive the role of nurses and nurse Practitioners

The need for prescribing has emerged alongside introduction of Nurse Practitioner Critical Care (NPCC) and Nurse Practitioner Midwifery (NPM) programs. The prescriptive role, rights and legal provision by Indian Nursing Council (INC) and MOH&FW, GoI have been deliberated in depth with the finalization of the Scope of Practice for NPMs. This learning module on fundamental principles of prescribing is being integrated as part of Pharmacology course. The nurse practitioners in midwifery will be able to prescribe from a limited list of approved drugs as per the scope of practice while providing midwifery services in Midwife led Care Units (MLCUs). Restrictions may be set for the type of practitioners as per their qualification and registration as per INC standards and regulations. Nurse practitioners in critical care will be able to follow protocol driven drug administration integrating collaborative and shared care with medical practitioners.

Standards of proficiency (Nursing & Midwifery Council - NMC, UK)

Nurse prescribers must have sufficient knowledge and competence to

1. Assess a patient's clinical condition
2. Undertake a through health history that includes medication history
3. Diagnose and decide on management of the presenting condition and whether or not to prescribe where necessary
4. Identify appropriate products if medication is required
5. Advise the patient on effects and risks
6. Prescribe if patient agrees and as per legal provision
7. Monitor response to medication and lifestyle advice

Scope:

The legal provision, policy, rules and regulations of INC and Government policy, codes of professional conduct and practice and standards of proficiency by INC will guide the prescriptive practice of nurses, nurse midwives, and practitioners.

Aims of nurse prescribing: The proposed prescriptive role of nurse practitioners

- Enables nurse practitioners to provide high clinical standards and meet the patients' needs
- Provides the prescribers with legal constraints around prescribing with sound principles and policies of prescribing
- Assists them in maintaining and improving their prescribing competencies
- Empowers nurse prescribers with personal accountability for the prescribed medication

Definition of terms

1. **Nurse practitioner:** Is one who has successfully completed the educational program prescribed by INC and is registered with the appropriate nursing council.
2. **Prescriptive rights:** The prescriptive rights bestowed on the nurse practitioner by way of regulation and standards set by GOI/INC alongside other related agencies of India for drug control.
3. **Independent prescribing:** Involves prescribing independently by the one who is responsible and accountable for patients that includes assessment of undiagnosed or diagnosed conditions and for decisions about the clinical management required including prescribing particularly by the primary care practitioner.
4. **Shared/collaborative prescribing:** Prescribing limited to protocols of specific clinical settings in consultation/collaboration with medical practitioners
5. **Administration of medicines:** The act of giving a medicine to a person, which may include some activity to prepare the medicine to be administered

6. **Competencies:** The knowledge, skill, and behaviors needed to adequately perform the function.
7. **Medicines:** Therapeutic goods that are represented to achieve, or are likely to achieve their principal intended action by pharmacological, chemical, immunological or metabolic means in or on the body of a human.

Schedule medicines (e.g. controlled drugs, prescription - only medicines, pharmacist - only medicines. Pharmacy - only medicines)

Unscheduled medicines such as OTC medicines such as medicines on open sale that do not require prescription (e.g. small packets of analgesics, and complementary medicines also called herbal, natural, and alternative medicines. Complementary medicines include products containing herbs, vitamins, minerals, nutritional supplements, homoeopathic medicines and bush and traditional medicines). Medicines are also known as 'medications"

8. **Prescribing:** An iterative process involving steps of information gathering, clinical decision making, communication and evaluation that results in the initiation, continuation or cessation of a medicine
9. **Nurse prescriber:** Nurse Practitioners authorized to undertake prescribing within the scope of their practice.
10. **Scope of practice:** The areas and extent of practice by NPs defined by a regulatory body after taking into consideration their training, experience, expertise and demonstrated competencies

Assignments/Self-directed reading (SDL):

1. Review of literature - International trends of non-medical prescribing particularly nurse prescribing
2. Prescriptive role of Nurse Practitioner in UK, USA, Australia, Singapore and Thailand

PART III: Professional, legal and ethical issues relevant to prescribing

A comprehensive understanding of professional, legal and ethical issues is a fundamental component of safe prescribing practice. Changes with regard to education and training, professional regulations and country's legislations related to drugs and prescribing, supply and administration of medicines influence the prescribing practice and the professional accountability.

Professional Issues

Professional regulatory bodies guide the nonmedical prescribing by setting regulations for practice. Regulators of nurse prescribers are required to set standards of education, training, conduct and performance and approve educational programs that prepare nurse practitioner to prescribe. The professional regulators are Indian Nursing Council and State Nursing Council.

Nurse practitioners must work within the boundaries of professional codes of conduct by INC with the intention of providing high quality standards of healthcare, safeguarding the public and promoting professional credibility. Additional qualification and training are required for prescribing. NPs must be able to assume personal accountability and responsibility. Safe prescription standards by regulatory body should guide the NPs in their decision-making and writing prescription.

Legal issues

Knowledge about India's legislation is essential for NPs in their practice. The law sets the standards of behavior and can be defined as a rule or body of rules. The Drugs and Cosmetics Act (1940) and Rules (1945) with latest amendments provides rules and regulations related to drugs, control, license, governance, and import. Regulatory councils/Commissions for Nursing, Medical and pharmacy are also regulators. Central Drugs Standard Control Organization (CDSCO) is a central drug authority for discharging functions assigned to central government under the Drugs and Cosmetics Act. CDSCO serves as a regulatory control over import of drugs, approval of new drugs and clinical trials, approval of licenses as central license approving authority and consists of a technical advisory board to advise on amendments to rules and regulations.

National Formulary of India, FDA and Acts of professional organizations guide prescribers in their safe and competent practice.

Ethical Issues

As prescribers, ethical dilemmas occur in their daily practice. They must draw combination of personal, group and philosophical ethics to assist in the decision- making. Ethical decisions must be guided by personal beliefs and values, professional code of conduct and the knowledge and analysis of ethical theories. The most essential ethical theories that

guide decision-making are consequentialism, deontology and virtue ethics. Decisions made considering the consequences are guided by the theory of consequentialism. Deontologists follow fundamental rules and consider duty and obligation are central to their decisions. Virtue ethics that involve compassion, honesty, loyalty, kindness and benevolence guide the prescribers to prescribe safely and effectively. Ethical principles such as autonomy, beneficence, non-maleficence and justice should also guide ethical decision-making. Professional integrity is an important element to be integrated in making ethical decisions.

Nurse practitioners must work within their professional codes of conduct and reflect on professional responsibility and accountability. Legal knowledge is essential for safe practice. They must apply moral and ethical theories in making ethical decisions while prescribing for their patients.

Assignments/SDL:

1. Laws and regulations relevant to drugs, prescribing and governance by GoI and professional regulatory bodies
2. International trends on legislation related to non-medical prescribing

PART IV: Principles and process of prescribing

Prescribing is one of the main approaches to treating and preventing diseases. In India, only medical practitioners perform it. It is also extended to other health professionals to use the resources maximally and thus it is extended to nurses particularly nurse practitioners in developed countries along with other health professionals (Eg. pharmacists, podiatrists, physiotherapists) who are also permitted to prescribe within restricted scope and limited formulary. All medicines have the capacity to enhance health however they also have the potential to cause harm if used inappropriately. For these reasons, all prescribers should follow principles of good prescribing. Bad prescribing can lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient and higher costs. They can also make the prescriber vulnerable to influences which can cause irrational prescribing such as patient pressure, bad example of colleagues and high powered salesmanship.

British pharmacological society recommends the following ten principles of prescribing

1. Be clear about the reasons for prescribing
   - Establish an accurate diagnosis whenever possible (although this may often be difficult)
   - Be clear in what the patient is likely to gain from the prescribed medicines.
2. Take into account the patient's medication history before prescribing
   - Obtain an accurate list of current and recent medications (including over-the counter and alternative medicines), prior adverse drug reactions, and drug allergies from the patient, their carers, or colleagues
3. Take into account other factors that might alter the benefits and risks of treatment
   - Consider other individual factors that might influence the prescription (e.g. physiological changes with age and pregnancy, or impaired kidney, liver or heart function)
4. Take into account the patient's ideas, concerns, and expectations
   - Seek to form a partnership with the patient when selecting treatments, making sure that they understand and agree with the reasons for talking the medicine
5. Select effective, safe and cost effective medicines individualized for the patient
   - The likely beneficial effect of the medicine should outweigh the extent of any potential harms, and whenever possible this judgement should be based on published evidence
   - Prescribe medicines that are unlicensed, off-lable or outside standard practice only if satisfied that an alternative medicine would not meet the patient's needs (this decision will be based on evidence and/or experience of their safety and efficacy)
   - Choose the best formulation, dose, frequency, route of administration, and duration of treatment
6. Adhere to national guidelines and local formularies where appropriate
   - Be aware of guidance produced by respected bodies (increasingly available via decision support systems), but always consider the individual needs of the patient
   - Select medicines with regard to costs and needs of other patients (health-care resources are finite)
   - Be able to identify, access, and use reliable and validate sources of information (e.g. National Formulary), and evaluate potentially less reliable information critically
7. Write unambiguous legal prescription using the correct documentation
   - Be aware of common factors that cause medication errors and know how to avoid them

8. Monitor the beneficial and adverse effects of medicines
    - Identify how the beneficial and adverse effects of treatment can be assessed
    - Understand how to alter the prescription as a result of this information
    - Know how to report adverse drug reactions
9. Communicate and document prescribing decisions and the reasons for them
    - Communicate clearly with patients, their carers, and colleagues
    - Give patients important information about how to take the medicine, what benefits might arise, adverse effects (especially those that will require urgent review), and any monitoring that is required
    - Use the health record and other means to document prescribing decisions accurately
10. Prescribe within the limitations of your knowledge, skill and experience
    - Always seek to keep the knowledge and skills that are relevant to your practice up to date
    - Be prepared to seek the advice and support of suitably qualified professional colleagues
    - Make sure that, where appropriate prescriptions are checked (e.g. calculations of intravenous doses)

Factors influencing prescribing

Prescribing is complex and every consultation is unique. To ensure safety and cost effective prescribing, the practitioners need to be aware of various factors that can influence prescribing. Adhering to principles of good prescribing is the first and foremost essential component that significantly influences prescribing practice. The other factors are discussed below. The major factors include prescriber related factors, patient related factors, product related factors and other professionals.

Prescriber related factors

The personal characteristics of the prescriber have a significant impact on the prescribing. Personal beliefs and values are important influences in selection of treatment and products. The confidence of the practitioner is enhanced by additional qualification, training, and experience. The practitioner's role change and responsibility can be influencing factors. Appropriate remuneration also positively influences their performance. Organizational resources, culture and support are other factors. Professional codes of conduct protect the practitioner and public. Government guidelines, INC standards and guidelines and legal provision in the act guide the practitioners to perform safe and effective prescribing.

Patient related factors

Consultation process is vital in making decisions for safe and effective prescribing. A structured approach to history taking with well-developed history-taking skills by the practitioners is required. Access to appropriate records indicating past health history and treatment history along with comprehensive history will provide sufficient information required to make decisions related to prescribing. A therapeutic relationship with the patient and communication is sure to enhance the success of prescribing. It is important to know the expectations of patients before generating the prescription. The practitioner needs to know the various options available before choosing the drug treatment. The patient's emotions, distress and anxiety can influence the prescribing consultation and their ability to convey accurate information or receive instructions and information about taking medication and observing for drug side effects. The patient is a consumer and practitioners should be vigilant to provide maximum patient safety by ensuring adequate knowledge about drugs, their side effects, potential drug interactions and adverse reactions. The skills of pharmaco-vigilance is highly important for practitioners. Patient's culture is another influencing factor. The awareness of the dynamics that result from cultural differences such as value preferences, perception of illness, health beliefs and communication style will help practitioners adapt treatment plants that meet the culturally unique needs.

Product related factors

The choice of the product, availability and access to formularies, external influences such as pharmaceutical companies and media are some of the major influencing factors. Every practitioner needs to ensure adequate knowledge about relevant national guidelines with evidence and local prescribing protocols. The choice of the product should be based on the formulary designed for nurse practitioner's use. Effectiveness and cost need to be considered first. National Formulary of India serves as a guideline for prescribers in India. Pharmaceutical companies are growing tremendously. The practitioners need to be aware of approved and licensed companies by the drug controlling authority of India. The advertisements and media about various products and companies also attempt to influence the prescribing decisions. Practitioners need to be aware of the fact and maintain healthy and professional relationship if required and utilize ethical principles and evidence base for making prescribing decisions.

Other professionals

Multidisciplinary team working and collaboration are emphasized greatly in healthcare. The success of prescribing by practitioners depends largely by cultivating sound and effective relationship with medical practitioners and hospital managers. The role of nurse practitioners in prescribing needs to be communicated to doctors and other healthcare professionals and is to be well understood. Communication and transfer of information are cornerstones for safe prescribing practice. The above-mentioned factors related to prescriber, patient, product and other professionals are discussed briefly as to how they influence the prescribing practice. The successful implementation of prescribing by nurse practitioners depends largely upon their knowledge about these factors. Identifying strategies to minimize potential negative influences can enhance the implementation and effectiveness of the prescribing practice by nurse practitioners.

Reading assignments

1. Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk

PART V: Process of prescribing

The national formulary of India 2016 is a published updated document available in India. The formulary provides general advice to prescribers in India. The process and steps of prescribing are discussed in the WHO guide to good prescribing (1994) and this is followed by India that is reflected in the formulary.

Process of rational prescribing

This involves selection of a drug treatment using the stepwise approach that includes the following.

1. Define the patients problem carefully (diagnosis)
2. Specify the therapeutic objective
3. Choose a treatment of proven efficiency and safety from different alternatives (refer national formulary of Indian, WHO List of essential drugs)
4. Start the treatment by writing an accurate prescription
5. Providing the patient with clear information and instructions
6. Monitor the results of the treatment
7. Stop the treatment if the problem has been solved.
8. If not re-examine all the steps.

Step 1. Define the patients problem Step

2. Specify the therapeutic objective Step

3. Select the therapeutic strategies

Step 4. Start the treatment and write the prescription

Step 5. Give information, instructions and warnings Step

6. Monitor the treatment

Box 1. The process of rational treatment

Step 1. Define the patient's problem

When defining the patient's problem, the knowledge of health assessment must be revised and skills are utilized. Whenever possible, making the right diagnosis is based on integrating many pieces of information such as the complaint as described by the patient, a detailed history, physical examination, laboratory tests, X-rays and other investigations. This helps in rational prescribing.

Step 2. Specify the therapeutic objective

After examining the holistic needs of the patient ask the following questions. Is the

diagnosis established?

Is information or advice sufficient? Is

there a need to prescribe?

What does the patient expect?

What is your objective for treating the patient? Define what you want to achieve from the drug. (e.g.) to suppress chronic dry cough to prevent heart attack in angina

The therapeutic objectives should be based on the pathophysiology underlying the clinical condition. More than one objective may be selected sometimes.

Step 3. Select the therapeutic strategies

Making a choice involves the following consideration

- Appropriate
- Effective
- Safe
- Cost
- Acceptable

Refer the following:

1. Nurse prescriber's formulary
2. National Formulary of India and national list of essential medicines
3. WHO list of essential drugs
4. Other relevant documents
5. Existing standard treatment protocols and guidelines

Select the strategy based on the knowledge of pathophysiology and the findings from history, examination, lab tests and other investigations. Medication or drug history and allergies are vital in the history that includes the following

- List of medications the patient is on with the repeat prescription of the medication
- Record from the history the name, dose, frequency and route of medication
- Prescribed or not
- Enquiry about OTC drugs (over the counter) or any other herbal preparations
- Any allergies reaction to medication, foods or environment factors and treatment given
- Recording of the above

History related to age, sex, hereditary factors, lifestyle factors, social and community networks living and working conditions, socio economic cultural and environmental conditions.

The selected strategy should be agreed with the patient that is known as concordance.

Non-pharmacological treatment:

Not all patients require a medicine for the treatment. Very often many health problems can be resolved by a change in lifestyle, diet, use of physiotherapy or exercise, and providing psychological support. These have the same effect as a drug and instructions must be written, explained and monitored in the same way.

Pharmacological treatment:

This involves selecting the correct group of drugs, selecting the medicine from the chosen group, and verifying the suitability of the chosen drug for each patient.

Knowledge about the pathophysiology of the clinical condition, pharmacokinetics and pharmacodynamics of the chosen drug are fundamental principles for rational therapeutics.

The selection process must consider the efficacy and safety of the drug.

For safety, the potential benefits of the treatment must always be balanced against known safety concerns. How to avoid adverse drug reaction?

1. Use as few concurrent drugs as possible.

2. Use the lowest effective dose.
3. Check if patient is pregnant or breast feeding
4. Is the patient at extremes of life?
5. Do you know all the drugs that the patient is taking
6. Check for over the counter medicines
7. Drug allergies or previous reaction to medications

Make an inventory of effective groups of drugs. Once you have compared various treatment alternatives and considered the four criteria such as efficacy, safety, suitability and cost, choose the drug.

In selection of the drug, choose an active substance and a dosage form, choose a standard dosage schedule, and choose a standard duration of treatment

Advice to be given to patient first with an explanation of why it is important, use words that patient can understand and be brief.

Step 4. Start the treatment

Prescribe the (treatment) drugs

Writing a prescription

A Prescription is an instruction from a prescriber to a pharmacist/dispenser. Prescriber is not always a doctor, it could be a nurse, medical assistant etc. The dispenser is not always the pharmacist it could be an assistant nurse. Every country has its own standards, laws and regulations as to who should prescribe, dispense and the required information in a prescription form, drugs that require prescription or not, special laws regarding narcotics etc.

Information on a prescription

Based on individual country's regulations. Legibility

Clarity (Legal obligation

Precision _

Information

- Name & address of the prescriber with telephone no (if possible)
- Date of prescription
- Name (Generic Name) and strength of drug
- Dosage form (only use standard abbreviations) Tab paracetamol 500 mg (10 tablets) BDx5 days.
- Label: how much, how often, special instruction,
- Name, address, age of patient.
- Prescriber's initials signature, License no.

Step 5. Give Information, Instruction and warnings

50% of patients do not take prescribed drugs correctly take irregularly or not at all. The most common reasons are that the symptoms have stopped, side effects have occurred, or the drug is not perceived as effective, or the dosage schedule is complex to understand. Giving information, instruction and warnings is important to ensure patient compliance/adherence

Adherence to drug treatment can be improved if

- Drug is well chosen and prescribed
- A Good prescriber patient relationship is created

- Time is taken to give necessary information, instructions and warnings.

How to improve patient adherence to drug treatment

- Prescribe a well-chosen treatment
- Create a good doctor-patient relationship
- Take the time to give information, instruction and warnings

Other aids to improve adherence could be patient leaflets, pictorials, day calendar, drug passport and dosage box.

Information to include:

- Effects of the drug
- Side effects
- Instructions
- Warnings
- Future consultation
- Confirmation of understanding

Step 6. Monitor the treatment (Stop or continue)

Monitoring enables you to determine whether the treatment has been successful or additional action is required. This allows stopping or reformulating if necessary or continuation of treatment.

Passive monitoring (self-monitoring)

Active monitoring (Future appointment & consultation)

s the treatment effective?

a. Yes, and disease cured/stop the treatment
b. Yes, but not yet completed - Any serious side effects
   - No: treatment can be continued
   - Yes: Reconsider dosage or drug choice
c. No, disease not cured - verify all steps:
   - Diagnosis correct
   - Therapeutic objective correct?
   - Drug prescribed correctly?
   - Effect monitored correctly?

Keep up to date about drugs

Knowledge is constantly changing. New drugs come to the market. Every prescriber is expected to know about the side effects and also developments in drug therapy.

Choosing sources of information

1. Make an inventory of available sources of information.
   - Reference books & Medical journals
   - Drug compendia - hand books for desk reference national formulary
   - National lists of essential drugs and treatment guidelines
   - Drug formularies
   - Drug bulletins, drug information centers
   - Verbal information
   - Drug industry sources of information
2. Choose between sources of information credible and accessible.

E.g. Medical journals, drug bulletins, pharmacology or clinical reference books, national formulary revisions

3. Effective reading- Read useful resources, clinical trials.

It is important to develop a strategy to maximize your access to key information you need for optimal benefit of the drugs you prescribe.

Assignments/Learning Activities - Case study discussion

Learning different steps of prescribing from case studies

Refer - The guide to good prescribing - Practice Manual, WHO, Geneva, 1994

PART VI: Prescribing Competencies

Every practitioner who prescribes must possess various competencies required by respective regulatory bodies. The prescribing competency framework recommended by NPC consists of three domains:

National Prescribing Centre (NPC, NICE -UK), 2014

1. The consultation
2. Prescribing efficiency
3. Prescribing in context

I Domain - The consultation Competencies

1. Knowledge

Has up-to-date clinical, pharmacological and pharmaceutical knowledge relevant to own area of practice.

2. Options

Makes or reviews a diagnosis, generates management options for the patient and follows up management.

3. **Shared Decision Making** (with parents, care-givers or advocates where appropriate)

Establishes a relationship based on trust and mutual respect. Recognizes patients in the consultation.

II Domain - Prescribing Effectively Competencies

4. Safe

Is aware of own limitation. Does not compromise patient safely.

5. Professional

Ensures prescribing practice is consistent with scope of practice, organizational, professional and regulatory standards, guidance and codes of conduct.

6. Always improving

Actively participates in the review and development of prescribing practice to optimize patient outcomes.

III Doman - Prescribing in context Competencies

7. The health care system

Understands and works within local and national policies, process and systems that impact on prescribing practice. Sees how own prescribing impacts on the wider healthcare community.

8. Information

Knows how to access relevant information. Can use and apply information in practice.

9. Self and others

Works in partnership with colleagues for the benefit of patients, is self-aware and confident in own ability as a prescriber.

Royal Pharmaceutical Society's (UK) Prescribing Competency Framework- Comprises of ten competencies within two domains.

THE CONSULTATION

1. Assess the patient
2. Consider the options
3. Reach a shared decision
4. Prescribe
5. Provide information
6. Monitor and review

PRESCRIBING GOVERNANCE

7. Prescribe safely
8. Prescribe professionally
9. Improve prescribing practice
10. Prescribe as part of a team

Reading assignments:

1. A Single Competency Framework for all prescribers NPC (National Prescribing Centre) (Provided by NICE), 2012
2. Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)

PART VII: Conclusion

Nurse prescribing is not a practice in India. With the introduction of Nurse practitioner program in Critical Care and midwifery, the need for granting prescriptive rights to NPs is being recognized. Legal provision for NPs to be involved in prescribing is being explored and INC is working towards developing regulations and legal provision along with MOH&FW. It is hoped that this will become a reality soon similar to the practice in UK, USA and Australia.

This learning and teaching module on Fundamentals of Prescribing is divided into 5 parts and can be offered to orient the students in prescribing practice, its principles and legislation required and the needed competencies for prescribers. Both theory and practical are planned with the assessment plan for the course module. This module will enhance the understanding of BSc nursing students on prescribing principles and assist them to develop the prescribing competency when called to use it as community health officer in Health and wellness centres/primary care settings.

References:

- Nuttal, D & Rutt- Howard, J (editors) (2011). The Text Book of Non- Medical Prescribing
- Royal Pharmaceutical Society, A Competency Framework for all prescribers (2016)
- Ten Principles of Good Prescribing, British Pharmacological Society, retrieved from www.bps.ac.uk
- A Single Competency Framework for all prescribers, National Prescribing Centre-NPC (Provided by NICE), 2012, NPC is part of NICE (National Institute for Health and Clinical Excellence, NICE) Ref. NICE (2012) A Single Competency Framework for all Prescribers NPC.
- Non- Medical Prescribing Policy, surrey with Sussex (NHS) NMPSS- prescribing principles, 2004
- National Formulary of India, 2016
- Drug & Cosmetics Act, 1940 & 1945
- The guide to good prescribing, WHO, Geneva, 1994

(NB: Latest edition must be consulted as and when revised)

PALLIATIVE CARE MODULE (Adult Health Nursing II)

PLACEMENT: IV SEMESTER

Theory & Practical: 20 hours

Theory: 15 hours

Practical: 5 hours

Module Overview: This module is designed to help students to develop in-depth knowledge, competencies, and a positive approach in providing quality palliative care to persons suffering from chronic illnesses and resultant health problems in variety of settings, collaborating supportive services.

Competencies (Learning Outcomes): The student will be able to

1. Explain the concept and significance of palliative care.
2. Identify the need for palliative care.
3. Discuss the importance and techniques of effective communication in palliative care
4. Demonstrate skill in assessment, management and evaluation of pain and common symptoms
5. Provide optimum nursing care to relieve symptoms and promote comfort.
6. Demonstrate competency in performing nursing procedures related to palliative care
7. Assist the patient to experience maximum Quality of Life.
8. Support patient and family for home care and to cope with the terminal phase of illness
9. Observe ethical and legal principles binding palliative care.

Learning Activities:

- Lectures and demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

- Test paper (Objective type/short answer/situation type) - 20 marks
- Assignments - 10 marks
- OSCE (Health assessment & Symptom management competencies) - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

CONTENT OUTLINE

T - Theory, P - Practical

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept significance of palliative care. Identify the need for palliative care. .	**Palliative Care** • Evolution, and History • Concept of palliative care • Significance • Components • Differences between conventional and palliative care approaches • Ethical aspects • Need for palliative care	• Lecture cum discussion	• MCQ • Short answers

Unit	Time (Hours)	Learning Outcome	Content	Teaching/Learning Activities	Assessment Methods
II	2	Discuss different aspects of effective communication. Describe how to deal with extremes of emotions	**Communication Skills** • Effective communication - needs and barriers • Non-verbal communication • Learning to communicate patients with advanced and progressive diseases • Communicating bad news • Managing collusion • Managing anger and denial	• Review • Discussion • Simulation • Case Scenario	• MCQ • Short answers • Role play
III	8 (T) 2 (P)	Demonstrate skill in assessment, management and evaluation of pain and other common symptoms Apply non-pharmacological and pharmacological Nursing interventions for pain relief. Render optimum nursing care to relieve symptoms and to promote comfort. Prepare the patient and caregiver for continued care.	**Nursing Management of Symptoms** • Holistic approach in symptom assessment and management, • Pain - concept, assessment and evaluation of pain, patho-physiology of chronic pain, • WHO ladder for pain management, Morphine – steps in calculating dose for oral morphine, management of opioid overdose and side effects, • Nursing interventions for management of pain • Management of dyspnoea, Nausea and vomiting, Constipation, Diarrhoea • Nutrition and Hydration • Fatigue and Powerlessness • Anxiety, Social isolation • Spiritual distress • Impaired physical mobility • Self-care deficit • Delirium • Caregiver role strain	• Review • Discussions • Demonstration	• Case study • Written assignment • Essay
IV	1 (T) 3 (P)	Demonstrate competency in performing nursing procedures related to palliative care.	**Nursing Procedures** • Wound care • Colostomy care • Subcutaneous injection • Oral hygiene • Naso-gastric tube management • Tracheotomy care • Assisting in thoracocentesis • Assisting in indwelling ascitic catheter placement • Lymphoedema management • Bladder care	• Review and discussions • Simulation	• OSCE

V	2 (T)	Discuss measures to improve Quality of Life. Explain care in the terminal phase, loss and grieving process. Observe ethical and legal principles applied to palliative care.	**Optimization of care** • Quality of Life • Essential care • Anticipatory prescription • Dying with dignity • Care during the terminal phase • Ethics based decision making • Death and dying, end of life Support to the care giver and family	• Review and discussion • Case scenario • Observation visit to a palliative care facility	• Short answers • Observation Visit Report

References:

- Rajagopal, M. R. (2015). An Indian Primer of Palliative care for medical students and doctors. Kerala: Trivandrum Institute of palliative science publication.
- Palliative care module prepared by WHO CC of Trivandrum and Calicut (Latest version to be used as and when available)

FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC),

PLS AND IMNCI MODULES (Child Health Nursing I)

FBNBC & ENBC: Can be offered as a single module

S.No.	HOURS	MODULE NUMBER & TITLE			
		I. FBNBC & ENBC	II. IMNCI	III. PLS	TOTAL
1	Theory Hours	10	10	3	**23**
2	Lab Hours	8	5	4	**17**
3	Clinical Hours	25	25	10	**60**
	Total	**43**	**40**	**17**	**100**

FACILITY BASED NEWBORN CARE (FBNBC) AND ESSENTIAL NEWBORN CARE (ENBC) (Child Health Nursing)

PLACEMENT: V SEMESTER

THEORY & SKILL LAB: 18 hours

Theory: 10 Hours

Skill Lab: 8 hours

MODULE OVERVIEW: This course is designed to help students to demonstrate the cognitive and psychomotor skills necessary for ensuring healthy survival of neonates.

COMPETENCIES (Learning outcomes): The student will be able to

1. Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby
2. Enlist the factors which contribute to heat loss in newborn
3. Demonstrate methods to keep the baby warm after birth and at home
4. Discuss Kangaroo mother care and develop skill in assisting for Kangaroo Mother Care
5. Recognize different methods to feed normal and low birth weight babies
6. Demonstrate skill in assisting the mother for breastfeeding the newborn baby
7. Identify and manage at-risk and sick neonates
8. Perform resuscitation of newborn baby and provide aftercare
9. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications
10. Enumerate key points in prevention of infection in hospitals and waste disposal

CONTENT OUTLINE

T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
1	1 (T) 1 (L)	Describe evidence based routine care of newborn baby at birth and everyday care of the newborn baby	**Evidence based care of newborn** • Basic needs of a normal baby at birth • Immediate care of the normal newborn at the time of birth • Monitoring the baby in the first hour after birth	• Lecture • Discussion	• Questioning • Tests

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Care of the baby in special situations • Postnatal care of normal baby		
2	1 T) 1(L)	Enlist the factors which contribute to heat loss in newborn Demonstrate methods to keep the baby warm after birth and at home	**Temperature regulation in newborn** • Handicaps of newborn in temperature regulation • Warm chain • Assessment of temperature and management of hypothermia • Hyperthermia	• Discussion • Demonstration	• OSCE
3	1 (T) 1 (L)	Discuss Kangaroo mother care and develop skill in assisting for Kangaroo Mother Care	**Kangaroo mother care** • KMC - Components and benefits • Requirements and eligibility • Procedure	• Discussion	• OSCE
4	1 (T) 1 (L)	Recognize different methods to feed normal and low birth weight babies Demonstrate skill in assisting the mother for breastfeeding the newborn baby	**Feeding the newborn** • Breast feeding • Feeding of low birth weight and sick newborns	• Discussion • Demonstration	• Tests • Questioning • OSCE
5	2 (T) 1 (L)	Identify and manage at-risk and sick neonates	**Care of sick neonates** • Care of at-risk neonates • Care of sick neonates	• Discussion • Demonstration	• Tests • Questioning
6	1 (T) 2 (L)	Perform resuscitation of newborn baby and provide aftercare	**Newborn Resuscitation** • Preparation for resuscitation • Assessing the need for resuscitation • Steps of resuscitation • Follow up care after successful resuscitation	• Demonstration and return demonstration	• Questioning • OSCE
7	2 (T) 1 (L)	Demonstrate skill in using and maintaining neonatal equipments, doing common procedures, preparing Common medications and emergency triaging	**Common nursing procedures** • Use and maintenance of neonatal equipments • Common procedures done in newborn • Preparation of common medications • Emergency triage assessment and treatment	• Discussion • Demonstration	• Tests • Questioning • OSCE
8	1 (T)	Enumerate key points in prevention of infection in hospitals and waste disposal	**fection prevention and control** • Principles of asepsis and universal precautions • Handwashing		• Tests • Questioning • OSCE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
			• Skin preparation for venipuncture and other procedures • Surveillance • Safe disposal of hospital waste		

CLINICAL: 25 hours

Clinical Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate immediate care of a newborn at the time of birth
2. Demonstrate methods to keep the baby warm after birth and at home
3. Encourage Kangaroo mother care
4. Recognize and practice different methods to feed normal and low birth weight babies
5. Identify and manage at-risk and sick neonates
6. Perform resuscitation of newborn baby and provide aftercare
7. Demonstrate skill in using and maintaining neonatal equipment, doing common procedures, emergency triaging and preparing common medications
8. Practice key points in prevention of infection in hospitals and waste disposal

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

IMNCI MODULE (Child Health Nursing I)

PLACEMENT: IV SEMESTER

THEORY: 10 hours

SKILL LAB: 5 hours

CLINICAL: 25 hours

DESCRIPTION: This course is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment, nursing care of infants and children with various diseases using guidelines as per IMNCI in the hospital and home settings.

COMPETENCIES (Learning outcomes): The student will be able to

1. Trace the history and developments in the field of integrated management of child health and child health nursing
2. Apply the concepts of IMNCI in providing care to the pediatric clients and their families
3. Identify effective management of young infants up to 2 months
4. Demonstrate skill in case management of young infants up to 2 months
5. Recognize effective management of children age 2 months to 5 years
6. Demonstrate skill in case management of children age 2 months to 5 years
7. Demonstrate skill in treatment procedures and referral of sick children
8. Demonstrate skill in counseling of the care takers

CONTENT OUTLINE

T - Theory, L - Lab/Skill Lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Trace the history and developments in the field of integrated management of child health and child health nursing	**IMNCI - Introduction** • Background and Objectives • Components and principles • Rationale for an integrated evidence based syndromic approach to case management	• Lecture • Discussion	• Written assignment • Tests
2	2 (T) 1 (L)	Apply the concepts of IMNCI in providing care to the pediatric clients and their families	**Steps of case management process** • Assess the young infant/child • Classify the illness • Identify treatment • Treat the young infant/ child • Counsel the mother • Provide follow up care	• Discussion • Demonstration	• OSCE
3	2 (T) 1 (L)	Identify effective management of young infants up to 2 months Demonstrate skill in case management of young infants up to 2 months	**Assessment of sick young infants** • History taking • Checking for possible bacterial infection/ jaundice • Diarrhea • Feeding problem/ malnutrition • Immunization status • Other problems	• Discussion • Demonstration	• OSCE

4	2 (T) 1 (L)	Recognize effective management of children age 2 months to 5 years Demonstrate skill in case management of children age 2 months to 5 years	**Assessment of sick children** • History taking • Checking for general danger signs • Checking main symptoms • Checking for malnutrition • Checking for anaemia • Assessment of feeding • Checking immunization Assessing other problems	• Discussion • Demonstration	• OSCE
5	2 (L)	Demonstrate skill in treatment procedures and referral of sick children referral of children	**Treatment procedures** • Identify treatment • Inpatient and outpatient treatment • Home management • Referral	• Discussion • Demonstration	• OSCE
6	2 (T)	Demonstrate skill in counseling of parents and care takers	**Parental counseling** • Advice regarding feeding and fluid intake, and solving of feeding problems • Administration of oral drugs • Advise when to return	• Discussion • Role play	• OSCE

Clinical: 25 hours

Practice Competencies: On completion of the course, the students will be able to:

1. Demonstrate skill in case management of young infants up to 2 months
2. Demonstrate skill in case management of children age 2 months to 5 years
3. Demonstrate skill in treatment procedures and referral of sick children
4. Demonstrate skill in counseling of the care takers and follow up care

Learning Resources: (Latest version must be consulted as and when revised)

National guidelines-MOH&FW

PLS MODULE (Child Health Nursing I)

PLACEMENT: V SEMESTER

Theory: 3 hours

Skill Lab: 4 Hours

Clinical: 10 Hours

COMPETENCIES (Learning outcomes): The student will be able to

1. Recognize early signs of critical illness in children
2. Identify early signs of cardiopulmonary arrest
3. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
4. Differentiate between respiratory distress and failure
5. Intervene respiratory distress and failure at the earliest
6. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
7. Demonstrate skill in CPR
8. Provide Post-cardiac arrest management

CONTENT OUTLINE

T - Theory, L - Lab/Skill lab

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
1	2 (T)	Recognize early signs of critical illness in children Identify early signs of cardiopulmonary arrest	**Identification of critical illness in children** • Early signs of critical illness in children • Early signs of cardiopulmonary arrest • Assessment of appearance based on AVPU scale	• Lecture • Discussion	• Questioning • Tests
2	1 (T)	Differentiate between respiratory distress and failure	• Respiratory distress • Respiratory failure	• Discussion	• OSCE
3	1 (L)	Intervene respiratory distress and failure at the earliest	• **Prompt Interventions for** Respiratory distress and Respiratory failure	• Discussion • Demonstration	• OSCE
4	1 (L)	State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system	**Medications used in cardiopulmonary arrest** • Indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system	• Discussion • Demonstration	• OSCE

5	1 (L)	Demonstrate skill in CPR	**CPR** • Steps in carrying out Child CPR	• Demonstration and return demonstration	• OSCE
6	1 (L)	Provide Post-cardiac arrest management	**Post-cardiac arrest management**	• Discussion • Demonstration	• OSCE

Clinical Practice Competencies: 10 hours

On completion of the course, the students will be able to:

1. Recognize early signs of critical illness in children
2. Demonstrate the use of the various airway and oxygen adjuncts and methods for optimum ventilation & airway control.
3. Differentiate between respiratory distress and failure
4. Intervene respiratory distress and failure at the earliest
5. State the indications & dosages of medications used in cardiopulmonary arrest and the effects on the cardiovascular system.
6. Demonstrate skill in CPR
7. Provide Post-cardiac arrest management

LEARNING ACTIVITIES: Specified in the above table.

ASSESSMENT METHODS:

- Test paper (Objective type/short answers) - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources: (Latest version must be consulted as and when revised)

1. National guidelines - MOH&FW
2. AHA guidelines

SBA MODULE & SAFE DELIVERY APP MODULE

(Midwifery/Obstetrics & Gynecology Nursing I&II)

PLACEMENT: VI & VII SEMESTER

Theory, skill lab and clinical hours are integrated in MIDWIFERY/OBS & GYNEC I & II Courses.

Module Overview:

SBA module is prepared by MOH&FW, GoI and can be used in MIDWIFERY/OBS & GYNEC I & II Courses.

Safe delivery app is available in INC website prepared by Maternity Foundation of India and INC

Competencies (Learning Outcomes): The student will be able to

1. Demonstrate knowledge and competencies to provide respectful maternity care to woman during antenatal, intranatal and postnatal periods in hospitals and community settings.
2. Provide safe and competent care to normal neonate and neonate with complications.
3. Identify complications in women during antenatal, intranatal, and postnatal periods.

Learning Activities:

- Lectures and Demonstration
- Self-study/Reading assignments
- Written assignments
- Practice in Skill/Simulation Lab

Assessment Methods:

SBA module

- Test paper - 20 marks
- Assignments - 10 marks
- OSCE - 20 marks

Safe Delivery App

Completion of Safe delivery app as champion.

Weightage to Internal Assessment: 10 marks to be added to internal marks to make up the total of 40 marks.

Learning Resources:

1. **SBA-A handbook for ANM, LHV & Staff nurses (2010),** MoH&FW document
2. Dakshata (2015) national guidelines
3. **SAFE DELIVERY APP**

(Maternity foundation of India and INC)

NB.

- Completion of both Modules is mandatory before the end of VII Semester.
- Latest Versions of National Guidelines must be consulted.

APPENDIX 02

LIST OF ELECTIVE MODULES

III & IV Semesters: *To complete any **one** elective by end of 4th semester across 1st to 4th semesters*

1. Human values
2. Diabetes care
3. Soft skills

V & VI Semesters: *To complete any **one** of the following before end of 6th semester*

4. CBT
5. Personality development
6. Addiction psychiatry
7. Adolescent health
8. Sports health
9. Accreditation and practice standards
10. Developmental psychology
11. Menopausal health
12. Health Economics

VII & VIII Semesters: *To complete any **one** of the following before end of 8th semester*

13. Scientific writing skills
14. Lactation management
15. Sexuality & Health
16. Stress management
17. Job readiness and employability in health care setting

Number of electives to be completed: 3 (Every module = 1 credit = 20 hours)

HUMAN VALUES

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge and attitude towards inculcating human values.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Understand the concept and importance of human values.
2. Analyze the impact of human values in family, society and profession.
3. Apply human values in education and clinical practice.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Explain the concept of human values, nature and types	**Introduction** • Introduction to human values - Definition and nature of human values • Types of human values - Different categorization • Instrumental and extrinsic values • Personal and professional values • Examples of human values - cooperation, honesty, caring, compassion, love, respect, sharing, loyalty, appreciation, integrity, discipline, justice, solidarity, civility, non-violence	• Lecture cum discussion • Discuss some of the human values having universal relevance • Value clarification exercise • Role play	• Quiz
II	4	Understand the significance of human values and in nursing Identify the difference between human, ethical and moral vales	**Importance of human values** • Need and importance of human values • Functions of values • Reflection on individual values • Human values, ethical values and moral values - differences and similarities	• Reflective exercises and report • Sharing in groups • Discuss lessons from the lives and teachings of great leaders, reformers and administrators	• Evaluation of reflective report/group work report
III	2	Explore the role of human values in family and society	**Role of human values in family and society** • Family values • Social standards • Influence of family and society	• Lecture cum discussion	• Short answers
IV	4	Discuss the role of educational institutions in inculcating human values	**Role of education and human values** • Teachers as role model • Development of accountability, appreciation and helping nature • Discipline as a human value • Value education strategies	• Lecture cum discussion • Case scenario and discussion	• MCQ • Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
V	4	Explain the core values at workplace and apply in clinical settings	**Professional Values** • Professional values - examples • Professional values and Value development in nursing • Core values at workplace, application in clinical settings and implications	• Case scenario and discussion • Application in clinical practice - Refection	• Evaluation of assignment
VI	2	Explain the influence of culture on values	**Values and cross-cultural influence** • Cultural values • Universal application • Universal declaration of human values and human rights	• Lecture cum discussion • Case scenario and discussion	• Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

DIABETES CARE

PLACEMENT: III & IV SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop knowledge, skill and attitude regarding Diabetes and care.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Understand the concept of NCDs and relevant national programs.
2. Review the pathophysiology and clinical diagnostic criteria for diabetes.
3. Analyze the diabetes treatment options such as medication, diet, exercise and life style modifications.
4. Apply the principles and demonstrate self-management skills to achieve diabetes control .
5. Identify onset of complications and provide means of seeking appropriate and timely help.
6. Demonstrate understanding of recent updates in diabetes.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain the concept of NCDs and national NCD programs	**Introduction** • Introduction to Diabetes as Non communicable disease burden - global & national - Review • Diabetes risk factors, preventive measures & risk reduction measures • Role of nurse in national programs relevant to Diabetes prevention, control and care	• Lecture cum discussion • Directed reading and assignments	• Quiz
II	4	Recall and discuss the pathophysiology of Diabetes, its clinical characteristics and diagnostic criteria	**Pathophysiology and diagnosis of Diabetes** • Review - structure & functions involved in key organs relating to diabetes (pancreas, liver, muscle, adipose tissue & kidney) • Relationship between blood glucose and insulin • Prediabetes condition • Types of Diabetes - Type I & II • Screening • Symptoms • Diagnostic Criteria	• Review • Case scenario and discussion • Sharing in groups	• Evaluation of group work report
III	4	Discuss the available treatment options	**Diabetes treatment options** • ***Life style modifications*** • ***Diet therapy*** • ***Exercise*** • ***Medical therapy*** oOral antidiabetic agents used to treat diabetes otypes, actions, side effects and contraindications	• Drug study • Written assignments	• Quiz • Test paper • Evaluation of written assignments

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			○ Combination treatment regimen ○ Medication considerations in elderly ○ Insulin therapy - Types, regimen, preparation and administration ○ Recent advances in medication therapy		
IV	3	Identify complications and provide timely support in management of complications	**Complications of diabetes** ***Diagnosis and management of*** • Hypoglycemia • Hyperglycemia • Diabetic ketoacidosis • Macrovascular complications • Diabetic retinopathy • Diabetic nephropathy • Neuropathy • Gestational diabetes in pregnancy	• Lecture cum discussion • Case study	• Short answers • Essay • Case study reports
V	5	Identify the challenges of living with diabetes Achieve effective self-management skills	**Self-Management** • Challenges of living with diabetes • Role of self-care in diabetes management • Effective self-management skills to attain and maintain diabetes control • Monitoring blood glucose levels -methods to monitor diabetes control and analysis of blood glucose patterns ***Nutrition therapy*** • Nutritional needs of patients with diabetes • Nutritional assessment • Determination of body mass index (BMI), waist-to-hip ratio • Meal planning methods • Problems associated with diet therapy ***Physical activity*** • Role of exercise in diabetes management • Components of exercise prescription • Exercise needs assessment • Types of exercises • Benefits of yoga for people with diabetes • Strategies to prevent hypoglycemia during or after exercise ***Medication therapy***	• Lecture cum discussion • Demonstration • Practice • Meal planning • Role play	• Short answers • OSCE • Assessment of meal plan

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Understanding action, side effects and contraindications • Insulin therapy - preparation and administration • Role of diabetes educator in education and counseling **Complication identification and seeking appropriate help**		
VI	2	Update the knowledge on diabetes, its management and care Discuss the role of diabetes educator Identify the role of complementary therapies	**Recent updates in diabetes** • Oral health and diabetes • Managing diabetes during disasters • Recent update on treatment and care modalities • Role of diabetes educator in diabetes care, education, counseling and management • Complementary therapies	• Lecture cum discussion • Directed reading	• MCQ • Short answers

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Meal planning) - 10 marks

LEARNING RESOURCES:

- Facilitator manual for training nursing staff on **"Prevention and Management of Non-Communicable Diseases"** developed by People to People Health Foundation (PPHF), 2019

SOFT SKILLS

PLACEMENT: III & IV SEMESTER

TOTAL HOURS: 1 Credit (20 hours)

DSECRIPTION: This module is designed to improve the soft skills of the students and covers important skills required for personal and professional lives such as etiquette, presentation, time management, motivation, decision making and team work.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Identify & perform personal, professional & Social Etiquette
2. Illustrate Telephone Etiquette
3. Learn & apply Presentation skills.
4. Be empowered in Public Speaking
5. Practice appropriate time management and use planning tools
6. Incorporate Motivational skills in practice
7. Develop Decision making skills
8. Demonstrate Teamwork in workplace

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	4	Identify & perform personal, professional & Social Etiquette	**Personal Etiquette:** • Grooming and personal hygiene • Body language-Postures & facial expressions • Punctuality and respectfulness • Manners **Professional Etiquette:** • Meeting etiquette • Workplace etiquette • communication etiquette-Oral & written **Social Etiquette:** • What is Social Etiquette? • Why are social skills important? • Types of social skills • Conversational skills - Greetings, listening, interacting • Common courtesies - Thank you, No thank you, Excuse me, May I • Social skill defects **Other types:** • Classroom etiquette-respectful and punctual, use of cell phone, engagement in the class • Virtual classroom etiquette • Social media etiquette	• Demonstration return demonstration	• Feedback from faculty and co-students

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
II	2	Illustrate Telephone Etiquette	**Telephone etiquette:** • Introduce yourself first • Clarity of speech • Active listening and take notes • Use appropriate language • Remain cheerful	• Demonstration return Demonstration	• Anonymous Assessment
III	3	Learn & apply Presentation skills.	**Presentation Skills:** • Introduction • Types of Presentation Skills • Structure • Importance of Presentation skills • Making a Presentation • Delivering a Presentation	• Lecture with discussion	• Sample presentations
IV	2	Empowered in Public Speaking	**Public Speaking:** • Elements of Public Speaking • Types of Public Speaking • How do you begin a speech • How do you make your speech good • Factors of Public Speaking	• Lecture & Demonstration return Demonstration	• Health talk
V	2	Practice appropriate time management and use planning tools	**Time management:** • Know how to spend time • Set priorities • Using a Planning Tool • Getting Organised/Schedule time appropriately	• Roleplay	• Adherence to Timeline
VI	2	Incorporate Motivational skills in practice	**Motivational skills:** • Forming and Changing Habit • Gratitude • Positivity • Mindfulness	• Lecture with discussion	• 360 degree Feedback
VII	2	Develop Decision making skills	**Decision making skills:** • What is Decision making skills • The 5 Decision making skills • Styles of Decision making • How to develop decision making	• Role play	• Critical thinking Competencies
VIII	2	Demonstrate Teamwork in workplace	**Team work:** • Differentiate team/teamwork • Examples of team work skills • Working with different teams • Build a team in your workplace environment	• Lecture with discussion	• Feedback from colleagues

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Time management/presentation/etiquette) - 10 marks

COGNITIVE BEHAVIOURAL THERAPY (CBT)

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire comprehensive knowledge regarding the basics of Cognitive Behavioural Therapy and develop an insight into behaviour of self and others. Further it is aimed at helping them to practice the principles of CBT for promoting Mental Health in Nursing Practice.

LEARNING OUTCOMES:

On completion of the module, the student will be able to:

1. Explain the concept and techniques of CBT
2. Use techniques to develop a therapeutic alliance based on CBT
3. Discuss cognitive conceptualization-automatic thoughts and alternative explanations based on cognitive model
4. Describe strategies to identify and respond to cognitions including dysfunctional cognitions
5. Formulate thought records and action plans

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6	Explain the concept and techniques of CBT Use techniques to develop a therapeutic alliance based on CBT	**Concepts and Techniques of CBT** • Concept - Definition • Techniques and applications of CBT • Factors influencing effective delivery of CBT • CBT Model • The therapeutic relationship and setting goals with clients	• Lecture and Discussion • Role play • Demonstration	• **Skills check:** Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals
II	4	Discuss cognitive conceptualization - automatic thoughts and alternative explanations based on cognitive model	**The Cognitive Model** • Three levels of thoughts • Automatic thoughts - development and tracking • Designing and implementing experiments to test automatic thoughts • Biofeedback in CBT	• Lecture cum discussion • Assignment on automatic thoughts and its testing	• Evaluation of assignment
III	5	Describe strategies to identify and respond to cognitions including dysfunctional cognitions	**Identifying, Evaluating and Responding to Cognitions** • **Socratic questioning -** Technique of questioning • **Behaviour experiments -** Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc.	• Lecture cum discussion • Role play • Assignment on identifying and responding to dysfunctional cognitions	• Evaluation of assignment
IV	5	Formulate thought records and action plans	**Designing Effective Action Plans and Thought Records** • Thought records components • Action plan components • Identifying underlying and new core beliefs and assumptions • Facilitating completion of the action plan and reviewing the action plan at the next session	• Lecture cum discussion • Role play	• **Skills check:** Formulate thought records and action plans and prepare worksheets

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Establishment of therapeutic relationship with client on CBT/Formulating thought records or action plans) - 10 marks

LEARNING RESOURCES:

1. Greenberger D, Padesky CA. Mind over Mood: Change How You Feel By Changing the Way You Think. The Guilford Press; 2016
2. Beck JS, Beck AT. Cognitive Therapy: Basics and Beyond. Guilford Publications; 2011

Websites: http://focus.psychiatryonline.org/cgi/content/full/4/2/173
http://www.learncognitivetherapy.com/cognitive_therapy.htm

NB:

- Brief notes on the content is attached below.

CORSE CONTENT (Brief notes below)

UNIT I (6 Hours): CONCEPTS AND TECHNIQUES OF CBT

Concept: CBT is based on the concept that mental disorders are associated with characteristic alterations in cognitive and behavioral functioning and that this pathology can be modified with pragmatic problem-focused techniques, interaction of thoughts, feelings and behaviour.

Techniques and Applications of CBT

CBT is a cognitive technique and behavioural technique.

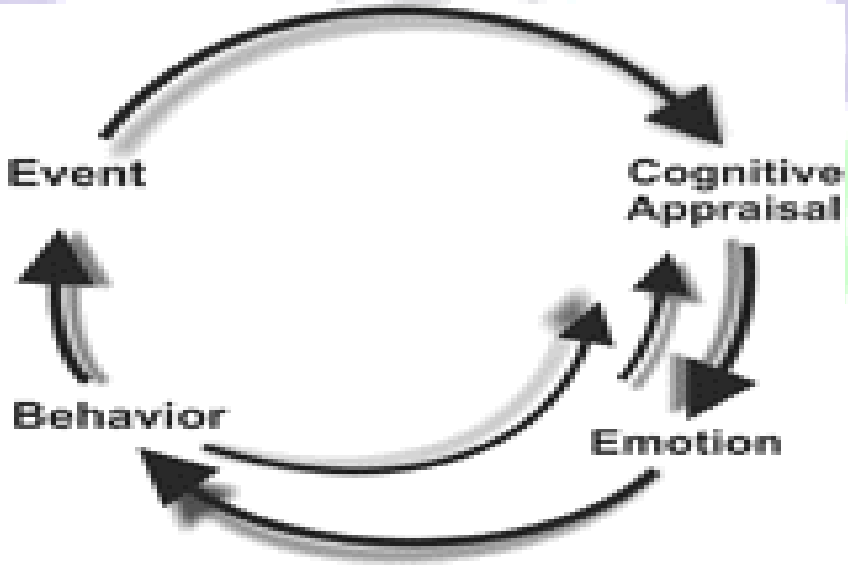
Application – wide applications: Psychiatric (Depression, Anxiety etc.) and non-psychiatric (sleep, fatigue, pain etc.)

Factors influencing effective delivery of CBT

Collaboration, formulation, homework etc.

The CBT model

Basic Cognitive Behaviour Model



Source: From Wright JH, Basco MR, Thase ME: Learning Cognitive-Behavior Therapy: An Illustrated Guide. Washington, DC, American Psychiatric Publishing, 2006, p 5.

The therapeutic relationship and setting goals with clients

- Assessment, person education, goal setting, practice of strategies, homework
- Collaborative therapy relationship

Skills check: Mastery demonstration of establishing a therapeutic relationship with the client in CBT and setting goals (Role play)

UNIT II (4 Hours): THE COGNITIVE MODEL

Three levels of thoughts: automatic thoughts, underlying assumptions and schemas

Understanding interplay between levels of thought and moods, behaviour, physical functions and practice

Automatic thoughts - development and tracking

- Moment to moment unplanned thoughts
- Explain and clarify identification of automatic thoughts with examples from thought records/worksheets

E.g: questions that include

a. What was going through your mind before you started to feel this way? Any other thoughts? Images?
b. Circle hot thought

Designing and implementing experiments to test automatic thoughts

- Using scale or rating for automatic thoughts

Biofeedback in CBT

- Role and significance of Biofeedback in CBT

Skills Check: Assignment on automatic thoughts and its testing

UNIT III (5 Hours): IDENTIFYING, EVALUATING, AND RESPONDING TO COGNITIONS

- Gathering evidence that supports and do not support the hot thoughts
- Actively search for information that contradicts the hot thoughts
- Writing all evidence for supporting that hot thoughts are not 100% true
- Identifying alternative or balanced thinking

Socratic questioning

- Technique of questioning

Behaviour experiments

Relaxation, mindfulness, distraction techniques, graded task assignments, task scheduling etc.

Skills check: Assignment on identifying and responding to dysfunctional cognitions

UNIT IV (5 Hours): DESIGNING EFFECTIVE ACTION PLANS AND THOUGHT RECORDS

Thought records components: situation, moods, automatic thoughts, evidence that supports hot thought, evidence that does not support hot thoughts, alternative or balanced thoughts, rate moods now

Action plan components: Goal, action plan, time to begin, possible problems, strategies to overcome problems, progress

Identifying a problem in life that a person would like to change and writing an action plan

Identifying underlying and new core beliefs and assumptions

- Identify core beliefs by looking for themes in thought record
- Test by looking for evidence
- Strengthen new core beliefs by recording experiences that are consistent, and rate the confidence

Facilitating completion of the action plan and reviewing the action plan at the next session

- Motivating the clients to complete the plans

Skills check: Assignment on Formulate thought records and action plans

PERSONALITY DEVELOPMENT

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students acquire an in-depth knowledge in factors influencing personality development, theories of personality development, personality traits, and personality disorders and further acquire skill in knowing one's own personality, understand others in their surroundings and bring positive change in life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe how personality develops
2. Define various stages of personality development
3. Describe basic personality traits and personality types
4. Analyze how personality affects career choices
5. Describe methods for changing personality
6. Enumerate personality disorders
7. Demonstrate skills in identifying personality disorders
8. Utilize knowledge in knowing self and others and improve relationship with others
9. Provide care to patients with personality disorders by emphasizing on respecting individual culture and spiritual needs

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods

I	2	Describe how personality develops
		
		Explain factors contributing to personality development
			Introduction to personality development
			• Definitions
			• Components of personality
			• Importance of personality in achieving goals and success in life
			• Factors influencing personality development
			  ○ Biological factors
			  ○ Environmental factors
			• Nature vs Nurture concept in personality development
				• Lecture and Discussion method
				• Guest lecture
					• Test paper
					• Quiz

II	5	Enumerate stages of personality development from infancy to late adulthood
		
		Explain various theories of personality development
			Stages and theories of personality development
			• Development of personality from infancy to late adulthood
			• Theories of personality development
			  ○ Psychoanalytic theory
			  ○ Psychosocial theory
			  ○ Trait and type theories of personality
			  ○ Humanistic approaches to personality
			  ○ Learning theories of personality
				• Lecture and Discussion method	• Test paper

III	3	List various types of personalities	**Assessment of personality** • Types of personalities	• Lecture and Discussion method	• Visit report • Written exam

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		Describe effects of illness on personality change Describe various personality assessments	• Personality changes due to illness • Personality assessment	• Visit to clinical psychology department • Guest lecture	• Case discussion
IV	5	Discuss personality and career success Explain various methods of changing personality traits Explain nursing implications of personality	**Personality and career success** • Role of personality and career success • Methods of changing personality traits o Personal growth and self-efficacy • Personality characteristics required for a nurse • Nursing implications of personality	• Lecture and Discussion method	• Written exam
V	5	Explain various personality disorders	**Personality disorders** • Definition • Types • Signs and symptoms • Medical management • Nursing management • Psycho-social therapies	• Lecture and Discussion method	• Perform assessment of personality disorder patient and write assessment report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

ADDICTION PSYCHIATRY

PLACEMENT: V & VI SEMESTER

THEORY & CLINICAL: 1 Credit (20 hours)

THEORY: 06 hours

CLINICAL: 14 hours

DESCRIPTION: This module is designed to help students to develop knowledge and competencies required for assessment, diagnosis, treatment and nursing management of individuals with various disorders related to addiction.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the Terminologies such as Substance Use Disorders, addictive behaviours, addiction etc
2. Describe the classification of Psychoactive Substances
3. Describe various etiological factors of substance related disorders
4. Identify the psycho social issues of the individuals with substance use disorders.
5. Identify treatment related adverse effects and emergencies and manage them effectively
6. Demonstrate skill in managing patients with substance use disorders.
7. Apply nursing process in caring for patients with substance related disorders.
8. Utilize available support to rehabilitate needy individuals.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	6 (T) 14 (P)	Explain and demonstrate skill in assessment of individuals with substance use disorders Explain and demonstrate skill in management and nursing management of individuals with substance use disorders	**Substance use disorders, assessment and management** • Terminologies: Substance related Disorders, addictive behaviour, intoxication, tolerance, withdrawal etc. • Classification of Psychoactive Substances • Factors associated with substance related disorders • Psychosocial problems associated with substance use • Treatment Modalities for Substance - Related Disorders – Multi-Disciplinary Team Approach • Treatment related adverse effects and emergencies • Introduction to technology addiction and its management • Nursing Management of patients with substance use disorders • Rehabilitaion issues	• Lecture cum discussion • Counseling Techniques • Disease model of addiction - Assignment • 2 day posting/visit to a de-addiction centre	• Perform assessment of individuals in in-patient or out-patient and write assessment report • Assessment of assignment • Performing health education at schools, colleges and other selected working areas - evaluation of education

CLINICAL: 14 hours

Clinical Practice Competencies:

On completion of the module, the student will be able to:

1. Assess individuals with substance use disorders
2. Identify risk factors of an individual and plan measures of management and relapse prevention
3. Inform, teach, and guide patients and their families

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of individuals with substance use disorders/health education) - 10 marks

ADOLESCENT HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 10 hours

LAB: 2 hours

CLINICAL: 8 hours

DESCRIPTION: This module is designed to help students to develop knowledge about developmental changes during adolescence and special psychosocial, reproductive and sexual health issues, needs and challenges of adolescents and competencies required for promoting their development and handling their health issues

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe the normal growth and development during adolescence
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promoting the development of life skills among adolescents
4. Identify the developmental needs of adolescents
5. Demonstrate skills in Identifying the developmental and Psychosocial issues and challenges during adolescence
6. Discuss the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
7. Demonstrate skills in communicating with adolescents
8. Develop competency in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents including Adjustment & conduct disorders, mental disorders, eating disorders, substance use disorders
10. Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted disorders, HIV/AIDS

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T) 2 (CL)	Describe the normal growth and development during adolescence Assess the physical, reproductive and sexual changes during adolescence Promoting the development of life skills among adolescents	**Growth and development of of adolescents** • Review of Principles of Growth and Development • Assessment of Growth and Development of Adolescents, including physical, reproductive and sexual changes • Promoting Growth and Development of Adolescents • Development of life skills among adolescents	• Discussion & Demonstration • Visit to the School or Family with Adolescent	• Perform assessment of Adolescent in School or Family and write assessment report
II	1 (T) 1 (Lab)	Discuss the nutritional requirements of adolescents, food habits and food	**Nutritional needs of adolescents** • Nutritional requirements of adolescents Food habits and food fads prevalent in the adolescent	• Discussion • Demonstration	• Plan a One day Menu for an adolescent

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		fads prevalent in the adolescents			
III	2 (T) 2 (CL)	Identify the developmental needs of adolescents Demonstrate skills in identifying the developmental and psychosocial issues and challenges during adolescence	**Developmental needs of Adolescents** • Developmental needs of Adolescents • Developmental issues during Adolescence • Psychosocial issues during Adolescence • Challenges during Adolescence • Guiding Parents on meeting the developmental needs of Adolescents and handling their issues and Challenges	• Discussion • Demonstration • Visit to the Family with Adolescent	• Visit report
IV	1 (T) 1 (Lab) 2 (CL)	Demonstrate skills in communicating with adolescents Develop competency in providing the Guidance and Counselling to adolescents	**Communication, guidance and counseling** • Communicating with adolescents • Guidance and Counselling • Role of Parents	• Discussion • Demonstration • Role Play	• Assessment of role play
V	2 (T) 2 (CL)	Identify, and manage common health problems among adolescents including adjustment & conduct disorders, mental disorders, eating disorders, and substance use disorders	**Common health problems including mental health problems** • Common health problems among adolescents • Adjustment & conduct disorders • Mental disorders • Eating disorders • Substance use disorders	• Lecture cum discussion • Visit to the Adolescent Clinic	• Visit report
VI	2 (T)	Describe the reproductive and sexual health issues of adolescents including Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception, sexually transmitted disorders, HIV/AIDS	**Reproductive and sexual health issues** • Reproductive and sexual health issues during adolescence • Sexual harassment, early marriage, teenage pregnancy, unsafe abortion and contraception • Sexually transmitted disorders, HIV/AIDS	• Lecture cum discussion	• Short answers

CLINICAL: 8 hours

Clinical Practice Competencies:

On completion of the module, the students will be able to:

1. Assesses the growth and development of adolescent
2. Assess the physical, reproductive and sexual changes during adolescence
3. Promote the development of life skills among adolescents
4. Identify and guide the parents to meet the developmental needs of adolescents
5. Demonstrate skills in communicating with adolescents
6. Identify the developmental and Psychosocial issues and challenges during adolescence
7. Identify the nutritional requirements of adolescents, food habits and food fads prevalent in the adolescents
8. Demonstrate skills in providing the Guidance and Counselling to adolescents
9. Identify, and manage common health problems among adolescents
10. Identify selected reproductive and sexual health issues of adolescents

ASSESSMENT METHODS:

- Test paper (Objective test, Short answers and case scenario and questions) - 30 marks
- Assignments - 10 marks
- Assessment of skills (Assessment of adolescent/One day menu planning for adolescent) - 10 marks

SPORTS HEALTH

PLACEMENT: V & VI SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This Elective module is designed to enable students to gain knowledge about Sports Health, and role of Nursing in Sports Health, training, and management of sports injuries.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Demonstrate understanding of sports health.
2. Should be able to assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care.
3. Participate effectively as a member of sports health team.
4. Understanding the importance of conditioning and sports injuries Rehabilitation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	15 (T)	Demonstrate understanding of sports health and Fitness pre-requisite for sports. Assess the severity of injury, recognize life threatening condition provide emergency care and initiate emergency procedures if any to avoid delay in care. Participate effectively as a member of sports health team. Understanding the importance of conditioning and sports injuries Rehabilitation.	1. Definition and scope of Sports Health and Physical Fitness 2. Pre-Participation exam for sports 3. On-field & Off-field evaluation of athlete 4. The Emergency Medical services System 5. Physiological Principle of strength Training/Conditioning, Deconditioning 6. Exercises and Environmental concern (Heat/Temperature Regulation, Acclimatization) 7. Common sports injuries & musculoskeletal assessment. 8. Therapeutic/Rehabilitation modalities overview. 9. On field management of sports injuries: Cryotherapy, sports taping etc. 10. Protective Equipment: protective wrapping, protective eye wear, Helmets, face mask. 11. Energy demands of Sports. 12. Nutritional supplements, 13. Ergogenic aids (Performance enhancing agents) and Doping.	• Guest lectures • Reading assignment by providing resources • Written assignment	• Short answers • Objective test • Viva voce
II	5 (P)	To assess the sports injury and provide emergency care		• Field work	• Evaluation of written field work

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

ACCREDITATION AND PRACTICE STANDARDS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to develop an understanding of quality assurance mechanism, the accreditation process and the accreditation and practice standards in nursing.

LEARNING OUTOMES:

On completion of the module, the student will be able to

1. Describe the Quality assurance mechanism in nursing
2. Explain the process of accreditation
3. Describe the accreditation standards for nursing institutions
4. Explain about the nursing practice standards and their rationale

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	5	Describe the Quality assurance mechanism in nursing	**Quality assurance in Nursing** • Review the current trends and practices of quality assurance in nursing • Definition and significance of quality assurance • Process of quality assurance • Components of quality assurance model • Methods of quality assurance evaluation • Quality assurance models of nursing in India • Roles and responsibilities of National and state nursing professional and regulatory bodies in quality assurance	• Lecture cum discussion	• MCQ • Short answers • Essay
II	5	Explain the process of accreditation	**Accreditation** • Definition of accreditation • The concepts of accreditation • Objectives of accreditation • Significance of accreditation • Types of accreditation • Accreditation process • Criteria for accreditations/Principal areas to be assessed • National and International accreditation agencies (education and health care organizations) ISO, UGC, NAAC, QCI, IEEA, JCI, NABH etc.	• Lecture cum discussion	• MCQ • Short answers • Essay
III	5	Describe the accreditation standards for nursing institutions	**Accreditation Standards for nursing institutions** • Definition of standards	• Lecture cum discussion	• MCQ • Short answers • Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Indian Nursing Council (INC) Standards - college/school and hospital/health facility • Standards for Quality Improvement in nursing**:** Standards Based Management and Recognition (SBM-R) approach • INC's Performance standards for various nursing institutions • International Council of Nurses (ICN) global standards for education and accreditation • International Confederation of Midwives (ICM) standards for professional Midwifery Education • WHO standards for educators		
IV	5	Explain about the nursing practice standards and their rationale	**Nursing Practice standards** • Code of ethics and professional conduct for nurses in India • ICN - Code of ethics • Definition of practice standards • National and international standards for nursing practice o INC standards for practice o National Nursing Commission Bill (Indian Nursing and Midwifery Council ACT (proposed) o ICM standards for professional Midwifery Practice o ICN global standards for practice • International nursing excellence - Magnet Recognition program, JCI standards • India - NABH nursing excellence standards	• Lecture cum discussion • Visit to NAAC or NABH accredited nursing institutions and health care facility	• MCQ • Short answers • Essay • Visit report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

LEARNING RESOURCES:

- UGC guidelines
- NACC guidelines
- NABH manual
- JCI manual
- INC, ICN, ICM & WHO websites - For education and practice standards

DEVELOPMENTAL PSYCHOLOGY

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: The module is designed to assist the students to acquire knowledge regarding the various dimensions of development and special concerns related to various age groups and to develop an insight into the problems of various age groups. Further it is aimed at helping the students to recognise the deviated behaviours of various age groups and apply the principles and strategies of mental hygiene for the promotion of mental health and prevention, diagnosis and management of mental illness

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Explain the theories related to the development of an individual
2. Describe prenatal development and special concerns related to the prenatal development
3. Explain the dimensions of development and special concerns related to infancy
4. Explain the dimensions of development and special concerns related to early childhood
5. Discuss the characteristics, dimensions of development and special concerns related to adolescence
6. Explain the characteristics, dimensions of development and special concerns related to adulthood
7. Describe the dimensions of development and special concerns related to elderly

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Describe growth and development	**Introduction** • Definition - Growth and development • Definition - Developmental psychology • Difference between growth and development • Dimensions of growth and development • Stages of development • Principles of development • Characteristics of development • Factors influencing the growth and development • Scope of developmental psychology	• Review • Lecture cum discussion	• Long Essay • Short Essay
II	2	Explain the theories related to the development of an individual	**Theories related to development** • Sigmund Freud Psychosexual development • Erik Erikson Psychosocial development • Piaget theory of cognitive development • Kohlberg's theory of moral development	• Lecture cum discussion	• Long Essay • Short Essay
III	3	Describe prenatal development and special concerns related to the prenatal development	**Prenatal development** • Term: Prenatal development • Stages of prenatal development • Principles of hereditary and twins mechanism	• Lecture cum discussion	• Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Factors affecting the prenatal development • Process of labour • Complications during labour that affects the transition period • Postnatal period • Complications in postnatal period that affects the transition period • Measures to reduce the risk during prenatal development, process of labour and postnatal period • Genetic counselling • Rooming in or KMC		
IV	2	Explain the dimensions of development and special concerns related to infancy	**Infancy** • Definition - Newborn and infancy • Normal characteristics of infancy • *Dimensions of growth and development in infancy:* o Physical, physiological and motor development o Cognitive development or intellectual development o Emotional development o Social development o Moral or character development o Language development • Special concerns in infancy • Remedial measures: Prevention and management • Newborn care and its significance • Breastfeeding and weaning and its significance • Parenthood • Low birth weight and its developmental consequences • Early infant stimulating programme	• Lecture cum discussion • Symposium	• Long Essay • Short Essay
V	2	Explain the dimensions of development and special concerns related to early childhood	**Early childhood** • Definition - Toddler and preschooler • Normal characteristics of toddler and preschooler • *Dimensions of growth and development in toddler and preschooler:* o Physical and motor development o Cognitive development or intellectual development o Emotional development o Social development o Moral or character development o Language development • Special concerns in toddler and preschooler • Remedial measure: Prevention and management	• Lecture cum discussion • Panel discussion	• Long Essay • Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
			• Lower order basic needs according to Maslow and its significance • Parent child bonding and its significance • Toilet training and its significance		

VI	2	Explain the characteristics, dimensions of development and special concerns related to middle and late adulthood	**Middle and late childhood**
			• Definition - School going children
			• Normal characteristics of School going children
			• *Dimensions of growth and development in middle and late childhood:*
			  ○ Physical and motor development
			  ○ Cognitive development or intellectual development
			  ○ Emotional development
			  ○ Social development
			  ○ Language development
			  ○ Moral or character development
			• Special concerns in school going children
			• Remedial measure: Prevention and management
			• Role of discipline in moral development
			• Role of play in the process of development
			• Effect of parental employment in the process of development
			• Effect of mass media in the process of development
			• Role of peer group in the process of development
			• Role of behavioural technique in the process of development
			• Parenting style and its significance
			• School based mental health programme and services
			• Teacher student relationship and its significance
				• Lecture cum discussion
				• Role play
					• Long Essay
					• Short Essay

VII	3	Discuss the characteristics, dimensions of development and special concerns related to adolescence	**Adolescence**
			• Definition - Adolescence and puberty
			• *Review:*
			  ○ Physiological and hormonal changes
			  ○ Sexual maturation: primary and secondary characteristics
			  ○ Psychological impact of puberty
			• Need for understanding the adolescence
			• Normal characteristics of adolescence
			• Misunderstanding about adolescence
				• Lecture cum discussion
				• Debate
					• Long Essay
					• Short Essay

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods

			• Adjustment and adolescence
			• *Dimensions of development in adolescence:*
			  ○ Cognitive development or intellectual and mental development
			  ○ Personality development
			  ○ Emotional development
			  ○ Social development
			  ○ Moral development
			• Special concerns in adolescence
			• Remedial measure: Prevention and management
			• Role of peer group or gang in the process of development
			• Role of parent, family and its relationship in the process of development		

VIII	2	Explain the characteristics, dimensions of development and special concerns related to adulthood	**Adulthood** • Definition - Early adulthood and middle adulthood • Physical changes in adulthood • Cognitive changes in adulthood • Personality development in adulthood • Emotional development in adulthood • Social development in adulthood • Unique issues in adulthood: career, marriage, parenthood • Special concerns in adulthood • Remedial measure: Prevention and management	• Lecture cum discussion • Panel discussion	• Short Essay
IX	2	Describe the dimensions of development and special concerns related to elderly	**Elderly** • Definition - Geriatric, Elderly • Theories of elderly • Physiological changes in elderly • Psychosocial changes in elderly • Special concerns in elderly • Remedial measure: Prevention and management • Terminal illness and elderly • Death and dying: Grief, palliative and hospice care	• Lecture cum discussion • Panel discussion • Case study • Visit to the old age home	• Essay • Short answers • Evaluation of Visit report/case study report

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

MENOPAUSAL HEALTH

PLACEMENT: V &VI SEMESTER

THEORY & CLINICAL: 1 credit (20 hours)
THEORY: 10 hours
CLINICAL: 10 hours

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in menopausal health. It further helps the students to develop competency in providing quality care to the menopausal women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Understand the concept of menopausal health in women.
2. Review and analyze the anatomy and physiology of menopause.
3. Develop competencies in providing quality care to these women.
4. Educate women and families about the problems faced by them.
5. Discuss the importance of hormone replacement therapy.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	1 (T)	Understand the concept and types of menopause	**Introduction** • Definition - menopausal health • Concept and types of menopause	• Lecture	• Objective test
II	2 (T)	Analyze the endocrinal changes during menopause	**Role of hormones in menopause** • Effect of hormones such as estrogen, androgen • Progesterone and gonadotrophin	• Lecture	• Short answers • Objective test
III	2 (T)	Describe Organ changes	**Organ changes during menopause** • Changes in the organs • Ovaries fallopian tubes, uterus, vagina, breast, bladder and urethra • Loss of muscle tone	• Lecture • Written assignment	• Short answers
IV	2 (T) 4 (CL)	Assess women to identify menopausal signs and symptoms	**Assessment of menopausal women** • History and physical examination • Diagnostic tests • Documentation	• Lecture • Assessment of women	• Short answers • Evaluation of assessment
V	3 (T) 6 (CL)	Describe management	**Management of menopause** • Identification of menopause • Management of the symptoms • Education and counseling of women and families • Hormone replacement therapy	• Lecture cum discussion • Case presentation	• Short answers • Evaluation of Case report

CLINICAL: 10 hours

Clinical Practice Competencies:

On completion of the course, the students will be able to

1. Counsel the women and her families
2. Understand the endocrinology of menopause
3. Perform the assessment and diagnose the women and plan proper nursing care
4. Educate the women about self care
5. Prepare the women for hormone replacement therapy

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

HEALTH ECONOMICS

PLACEMENT: V & VI SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to help students to understand the basic concept of economics, health economics, the relationship between health and economic development, demand and supply, concept of cost and financing systems of health care services in India. This will enable them to appreciate financial aspects of health care services.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Explain the meaning of economics and health economics.
2. Analyze the relationship between health and economic development.
3. Explain the concept of demand and supply.
4. Describe the structure of health care industry and characteristics of market for health care services.
5. Analyze the concept of cost in health care.
6. Discuss financing system of health care services in India.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Understand the meaning and purpose of Economics and Health Economics	**Introduction to Economics** • Definition and meaning • Dimensions of economics Micro and Macro-economics • Positive and Normative economics	• Lecture cum discussion	• MCQ • Short answers
II	4	Explain the basic concepts, focus and areas of health economics Discuss the Implications of economic development to the health care services Describe the factors that contribute to health problems in India and their solution	**Introduction to Health Economics** • Concept of health economics • Scope of Health economics • Focus of health economics • Areas of health economics • The economics of health and health care service, health and economic development. • Implications of economic development to the health care services • Mechanism and sources of health financing in the country. • Causes of health problems in India. • Solutions to health problems	• Lecture cum discussion • Case study	• MCQ • Short answers • Essay
III	4	Explain the concept and types of cost Describe Cost benefit analysis and Cost-effectiveness analysis in health care	**Cost of Health Care** • Concept of cost, types of costs • Opportunity cost, total fixed and variable cost, average marginal and sunk cost • cost benefit analysis and cost effectiveness analysis	• Lecture cum discussion • Case study	• Short answers

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
IV	4	Understand the basic concept of financial management Explain the characteristics of health care industry	**Demand and Supply in Health Care** • Concept of demand, need, supply, input, output, production function, industry and market • Structure of health care industry • Characteristics of health care services market • Demand side and supply side • Factors affecting demand • Factors influencing demand for medical care • Factors affecting supply	• Lecture cum discussion • Assignment on Demand for medical care	• MCQ • Evaluation of Assignment
V	6	Describe the sources of financing of health care services Discuss various health insurance schemes Explain the role of state and central government on financing of health care services.	**Financing of Health Care in India** • Financing system and allocation • Sources of financing of health care services • Health plans and outlays, the relative role of state and central government on financing of health care services • Factors influencing the state's ability to finance health care services • Role of voluntary organizations in health care • Public Private Partnership in providing services in health care	• Lecture cum discussion • Assignment - role of voluntary organizations in health care	• Short answers • Evaluation of assignment

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

SCIENTIFIC WRITING SKILLS

PLACEEMENT: VII & VIII SEMESTER

Credit & Hours: 1 Credit (20 hours)
THEORY: 12 hours
PRACTIICAL/LAB: 8 hours

DESCRIPTION: This module is designed to provide the students with the necessary knowledge base to succeed in publishing scientific papers in indexed national/international journals or to prepare a grant application.

LEARNING OUTCOMES: On completion of this module, the student will be able to

1. Get inspiration and motivation to write effectively, concisely and clearly.
2. Understand the process and basics of scientific writing and publishing.
3. Equip them with skills to cite and manage references.
4. Write scientific manuscript for publication in indexed national/international journals.
5. Apply the principles in grant writing.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Get motivated to write	**Basics of good writing** • What makes good writing - choice of words, components of sentences and sentence structure, using tenses • Clarity, brevity and fitness - punctuation, paragraphs, logic and organization • Motivation for writing	• Discussion • Review of news article	• Quiz
II	2 (T) 2 (L)	Explain the basics and principles writing a scientific manuscript Develop skills to cite and manage references	**Basics of writing a scientific manuscript** • Definition and types • Characteristics - clear, simple and impartial • Reading scientific literature • *General Principles:* o Ask right questions o Avoid jargon where possible o Focus on your reader o Don't show off o Create a compelling opening paragraph o Be confident o Learn how to KISS (Keep it short and simple) o Get active - Use the active voice rather than the passive one. o Check for errors o Use a style guide - writing style, referencing style o Tools for reference management	• Lecture cum discussion • Reading scientific literature-Exercise	• Quiz • Test paper
III	2 (T)	Develop skills in preparing conference	**Writing for conferences and publications** • *Conferences*	• Discussion	• Test paper

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		materials and presentation skills. Describe the publishing process and ethics	○ Developing conference materials: abstracts, posters and oral presentation. ○ Conference presentation skills • *Publications:* ○ Phases for writing-planning, writing and publishing phase ○ Reporting guidelines - CONSORT, STROBE etc ○ Journals - choosing the right type of journal ○ Publication ethics ○ Author's responsibility ○ Editorial process ○ Plagiarism check tools	• Preparation of a conference paper/ poster • Guided reading • Written assignment - reporting guidelines	• Assessment of the written assignment
I	4 (T) 4 (L)	Develop skills in writing a research paper	**Writing a research paper** • General principles • Writing an Abstract • IMRAD format - ○ Introduction ○ Methods ○ Results ○ And ○ Discussion	• Lecture cum discussion/ Workshop on writing • Exercise on writing an abstract • Exercise on writing an effective discussion • Writing exercise for preparation of research paper for publication	• Evaluation of the prepared research manuscript for publication
IV	2 (T) 2 (L)	Develop beginning skills of preparing a grant proposal with basic understanding	**Overview of grant writing** • Purposes • Funding opportunities • Principles • Writing a grant proposal	• Exercise: Identify grant opportunities • Exercise: write a grant proposal	• Evaluation of the exercise

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

LACTATION MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY: 0.5 Credit (10 hours)

CLINICAL: 0.5 Credit (10 hours)

DESCRIPTION: The module is designed to develop in-depth knowledge and understanding in lactation management . It also help the students to develop competency in providing quality care to the lactating women and her families.

LEARNING OUTCOMES: On completion of the module, the student will be able to:

1. Understand the concept of lactation and anatomy of breast in postpartum women.
2. Discuss the physiology of lactation and composition of breast milk.
3. Develop competencies in providing quality nursing care to these women based on nursing process.
4. Educate women and families about the lactation problems faced by them and improve in breast feeding.
5. Dicuss the advantages of breast feeding and bonding.
6. Explain the importance of taking well balanced diet to facilitate lactation.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2 (T)	Review the anatomy of breast	**Anatomy of breast-Review** • Concept and anatomy of breast	• Use of models • Discussion	• Objective test • Short answers
II	2 (T)	Explain the Physiology of lactation	**Physiology of lactation** • Physiology of lactation • Benefits of breast feeding	• Discussion	• Short answers • Objective test
III	4 (T) 8 (CL)	Provide quality nursing care	**Management of lactation** • Quality nursing care to patient for lactating women • Well-balanced diet • Technique of breast feeding • Prevention of breast engorgement	• Demonstration • Discussion • Case presentation	• Short answers • Objective test • Case report
IV	2 (T) 2 (L)	Provide health education	**Health education** on • Diet during lactation • Breast care • Clothing • Personal hygiene etc.	• Case method • Demonstration	• Case report

CLINICAL PRACTICE COMPETENCIES:

On completion of the program student will be able to:

1. Provide quality nursing care to lactating women
2. Develop competency in supporting breast feeding
3. Educate lactating women regarding self-care and well-balanced diet, personal care etc.
4. Develop competency in records and reports
5. Encourage mother child bonding
6. Develop competency in preventing breast complications

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

SEXUALITY AND HEALTH

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 16 hours

PRACTICAL: 4 hours

DESCRIPTION: Sexuality and Health is an elective module for nursing students who wish to make a future in sexual Health clinics/counseling. This module intends to train the nurses to help people to maintain sexual health.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Identify the basic components of the human reproductive system and describe the basic functions of the various reproductive organs.
2. Describe the changes that occur during puberty and secondary sexual characteristics.
3. Examine and evaluate the risk factors associated with exposure to blood-borne diseases.
4. Determine 'safer' sex practices.
5. Develop strategies to reduce sexual risk.
6. Explain the role of trust and ways to establish trust in a relationship.
7. Evaluate implications and consequences of sexual assault on a victim.
8. Explain the legislations related to sexual assaults in India.
9. Provide health education on safer sex practices and prevent the sexually transmitted diseases/blood borne diseases.
10. Assess a victim of sexual abuse/assault/harassment/child abuse.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	3	Identify the basic components of the human reproductive system, and describe the basic functions of the various reproductive organs Describe the changes that occur during puberty; secondary sexual characteristics	**Introduction to Sexuality -** • Anatomy of the human reproductive system and the basic functions; fertilization, conception. • Changes during puberty (physical, emotional and social) • Secondary sexual characteristics	• Lecture cum discussion	• Short answers • Objective test
II	3	Examine and evaluate the risk factors associated with exposure to blood-borne diseases	**Risk factors associated with exposure to blood-borne diseases -** HIV, AIDS, Hepatitis • Sharing needles • Body piercing • Tattooing • Helping someone who is bleeding etc.	• Lecture cum discussion • Role play • Group Discussion	• Short answers • Objective test

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
III	3	Determine 'safer' sex practices Develop strategies to reduce sexual risk Explain the role of trust and ways to establish trust in a relationship	'**Safer' sex practices:** • Communicate with partner • Maintain abstinence • Limit partners • Access/use condoms/ contraceptives properly *Strategies to reduce sexual risk:* • Abstain from drugs and alcohol, date in groups, use assertive behavior • Expectations & commitments in a relationship • Role of trust and ways to establish trust in a relationship	• Lecture cum discussion	• Short answers • Objective test
IV	5	Analyze the implications and consequences of sexual assault on a victim Explain the legislations related to sexual assaults in India	**Sexual assault/abuse** *Implications and consequences of sexual assault on a victim* • Child sexual abuse • Sexual assault of boys • Incest • Intimate partner sexual abuse • Rapes *Legislation related to sexual assault in India* • Criminal Law amendment Act -2013 • Sexual Harassment at workplace • Protection of children against sexual offences	• Lecture cum discussion • Case discussion • Guest lecture • Reading/written assignments	• Short answers • Objective test
V	2	Develop understanding and skills on sexual health education	**Sexual Health Education** • Health education - principles and application • Health education on safer sex practices • Counselling the sexually assaulted/abused child/ adolescent/adults	• Observe/practice at the education/ counseling clinic/ centre	• Evaluation of the report
VI	4 (P)	Develop skills in assessment of sexually abused victim and provide sexual health education	• Sexual health education - adolescents and young adults • Assessment of sexually abused victim - child/adolescent/adult	• Clinical field	• Assessment of sexually abused victim • Sexual health education

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

STRESS MANAGEMENT

PLACEMENT: VII & VIII SEMESTER

THEORY & PRACTICAL: 1 Credit (20 hours)

THEORY: 15 hours

PRACTICAL: 5 hours

DESCRIPTION: This module is designed to enhance the understanding of students about stress and its effects on human behavior and physiology. Further it discusses the techniques and implementation of stress management in personal and professional life.

LEARNING OUTCOMES:

On completion of the module, the student will be able to

1. Describe stress and stressors.
2. Identify the causes of unwanted stress.
3. Understand how stress works and its effects on human behavior and physiology.
4. Develop techniques to avoid stress affect the personal and professional life.
5. Utilize effective stress reduction techniques.
6. Develop a Personal Action Plan for Stress Management.

CONTENT OUTLINE

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
I	3 (T) 1 (P)	Describe stress and stressors. Identify the causes of unwanted stress.	**Introduction** • Concept of stress, definition • Types of stress: positive, negative • Various sources of stress: environmental, social, physiological, psychological • Types of stressors: internal and external	• Lecture cum discussion • Practice session on identifying own stressors	• Short answers • Objective test • Assessment of practice sessions
II	5 (T) 1 (P)	Understand how stress works and its effects on human behavior and physiology	**Stress and its effect on human physiology and behaviour** • Body's response to stress: Hans Selye's General Adaptation Syndrome • Stress Cycles: distress and wellness cycle • Cognitive appraisal of stressors • Stress symptoms: emotional, behavioural, physical • Stress and diseases: cancer, Gastric ulcer, Bronchial asthma, effect on endocrine glands, Psycho-sexual disease, Anxiety Neurosis • Assessing stress levels Holmes - Rahe - life change index	• Lecture cum discussion • Practice session assessment of stress level of self and peer group, scoring & classifying the risk.	• Short answers • Essay types • Preparing stress assessment scale
III	5 (T) 1 (P)	Develop techniques to avoid stress affect the personal and professional life.	**Stress avoidance techniques** • Individual difference in resistance to stress: optimism & pessimism • Strategies of stress prevention	• Lecture cum discussion • Practice session • Role play on Conflict	• Assessment of the skills based on the check list • Short answers

Unit	Time (Hrs)	Learning Outcomes	Content	Teaching Learning Activities	Assessment Methods
			& management ○ Challenging stressful thinking/resilience and stress ○ Problem solving and time management ○ Physical methods of stress reduction ○ Preparing for occupational stress ○ Care of self: Nutrition & other lifestyle issues ○ Conflict management in relationship	Management/ Use of problem - solving approach for professional problem	• Essay types
IV	2 (T) 2 (P)	Utilize effective stress reduction techniques Develop a Personal Action Plan for Stress Management	**Stress reduction strategies** • Utilizing stress reduction techniques • Relaxation techniques: • abdominal breathing • progressive relaxation, • massage • biofeedback • autogenic training-self hypnosis • visualization and mental imagery • Enhance self esteem • Support groups	• Exercise on: Relaxation techniques: abdominal breathing, progressive relaxation. • Develop a Personal Action Plan for Stress Management	• Assessment of the skills based on the check list

ASSESSMENT METHODS:

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

JOB READINESS/EMPLOYABILITY IN HEALTH CARE

PLACEMENT: VII & VIII SEMESTER

THEORY: 1 Credit (20 hours)

DESCRIPTION: This module is designed to prepare the nursing students towards entering their profession in terms of clinical context, the complexity of care requirements, and utilization of resources available and in terms of soft skills.

LEARNING OUTCOMES: On completion of the module, the student will be able to

1. Demonstrate the employability skills required at different levels and in different roles across the health sector.
2. Identify the personal skills, qualities, values, attributes and behaviours needed at each career level.

CONTENT OUTLINE

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
I	2	Explain about the Nursing career and various roles in nursing	**Introduction** • Nursing - A Career in Life • Roles and responsibilities of an employee • Adaptation towards working environment • Career Guidance - Employment opportunities in Nursing	• Lecture cum discussion	• Essay on career opportunities
II	5	Describe the characteristics and values that an individual must have before they can do a job effectively.	**Employability Skill** • Job-readiness attributes o Communication skill o Technological skill o Teamwork skill o Interpersonal skill o Critical thinking and Problem-solving skill o Planning and organizing skill o Conceptual and analytical skill o Self confidence o Inter profession practice o Work psychology-positivity workplace attitude o Stress awareness and management • Soft skills	• Lecture cum discussion • Role playing	• Practical assessment
III	5	Describe the safe care and skills required to manage the workforce environment	**Complexity of care** • Safe Practice • Practice within scope of practice • Management of workload • Ability work effectively within the health care team • Legal and ethical boundaries	• Lecture cum discussion • Written assignment on scope of practice	• Assessment of assignment
IV	3	Explain the importance of employability towards meeting	**Autonomy and Supervision** • Autonomy - Accountability, Responsibility, Recognition of scope of practice • Supervision/Delegation	• Lecture cum discussion	• Quiz

Unit	Time (Hours)	Learning Outcomes	Content	Teaching/Learning Activities	Assessment Methods
		the organization goal.			
V	5	Enumerate the subject knowledge required to provide quality care.	**Application of Knowledge** • Generalist Nursing Knowledge • Knowledge on Quality Care • Knowledge on Ethical aspects • Knowledge on Legal aspects • Critical Appraisal • Knowledge seeking behaviour	• Lecture cum discussion	• Self-discovery exercise

ASSESSMENT METHODS

- Test paper (Objective test, short answers and case scenario and questions) - 30 marks
- Assessment of assignments/skills - 20 marks

APPENDIX 03

INTERNAL ASSESSMENT: DISTRIBUTION OF MARKS

I SEMESTER

S.No.	Name of the Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Internal Marks
	Theory			
1	Communicative English	10	15	25
2	Applied Anatomy & Applied Physiology	10	15	25
3	Applied Sociology & Applied Psychology	10	15	25
4	Nursing Foundation I	10	15	25
	Practical			
5	Nursing Foundation I	10	15	25

II SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Marks
	Theory			
1	Applied Biochemistry and Applied Nutrition & Dietetics	10	15	25
2	Nursing Foundation II including First Aid I & II	10	15	25 I & II = 25+25 = 50/2
3	Health/Nursing Informatics & Technology	10	15	25
	Practical			
4	Nursing Foundation I & II II	10	15	25 I & II = 25+25 = 50

III SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams – Theory/Practical	Total Marks
	Theory			
1	Applied Microbiology and Infection Control including Safety	10	15	25
2	Pharmacology I and Pathology I	10	15	25
3	Adult Health Nursing I with integrated pathophysiology including BCLS module	10	15	25
	Practical			
4	Adult Health Nursing I	20	30	50

IV SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Pharmacology II & Pathology II I & II	10	15	25 I & II = 25+25 = 50/2
2	Adult Health Nursing II with integrated pathophysiology including Geriatric Nursing	10	15	25
3	Professionalism, Professional values & Ethics including bioethics	10	15	25
	Practical			
4	Adult Health Nursing II	20	30	50

V SEMESTER

S.No.	Course	Continuous Assessment	Sessional Theory/ Practical Exams	Total Marks
	Theory			
1	Child Health Nursing I	10	15	25
2	Mental Health Nursing I	10	15	25
3	Community Health Nursing I	10	15	25
4	Educational Technology/ Nursing Education	10	15	25
5	Introduction to Forensic Nursing and Indian Laws	10	15	25
	Practical			
6	Child Health Nursing I	10	15	25
7	Mental Health Nursing I	10	15	25
8	Community Health Nursing I	20	30	50

VI SEMESTER

S.No.	Course	Continuous Assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Child Health Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
2	Mental Health Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
3	Nursing Management and Leadership	10	15	25
4	Midwifery/Obstetrics and Gynecology I	10	15	25
	Practical			
5	Child Health Nursing II I & II	10	15	25 I & II = 25+25 = 50
6	Mental Health Nursing II I & II	10	15	25 I & II = 25+25 = 50
7	Midwifery/Obstetrics and Gynecology (OBG) Nursing I	10	15	25

VII SEMESTER

S.No.	Course	Continuous assessment	Sessional Exams/ Practical	Total Marks
	Theory			
1	Community Health Nursing II	10	15	25
2	Nursing Research & Statistics	10	15	25
3	Midwifery/Obstetrics and Gynecology (OBG) Nursing II I & II	10	15	25 I & II = 25+25 = 50/2
	Practical			
4	Community Health Nursing II	20	30	50
5	Midwifery/Obstetrics and Gynecology (OBG) Nursing II I & II	10	15	25 I & II = 25+25 = 50

VIII SEMESTER (Internship)

S.No.	Course	Continuous performance evaluation	OSCE	Total Marks
1	Competency assessment – 5	Each specialty – 10 5×10 = 50	Each specialty – 10 5×10 = 50	100

APPENDIX 04

INTERNAL ASSESSMENT GUIDELINES THEORY

I. CONTINUOUS ASSESSMENT: 10 marks

1. Attendance – **2 marks** (95-100%: 2 marks, 90-94: 1.5 marks, 85-89: 1 mark, 80-84: 0.5 mark, <80: 0)
2. Written assignments (Two) – **10 marks**
3. Seminar/microteaching/individual presentation (Two) – **12 marks**
4. Group project/work/report –

6 marks Total = 30/3 = 10

If there is mandatory module in that semester, marks obtained by student out of 10 can be added to 30 totaling 40 marks

Total = 40/4 = 10 marks

II. SESSIONAL EXAMINATIONS: 15 marks

Two sessional exams per course

Exam pattern:

MCQ – 4×1 = 4

Essay – 1×10 = 10

Short – 2×5 = 10

Very Short – 3×2 = 6

30 arks × 2 = 60/4 = 15

III. CONTINUOUS PRACTICAL ASSESSMENT MARKS: 10

1. Attendance – **2 marks** (95-100%: 2 marks, 90-94: 1.5 marks, 85-89: 1 mark, 80-84: 0.5 mark, <80: 0)
2. Clinical assignments – **10 marks**

   (Clinical presentation – 3, drug presentation & report – 2, case study report – 5)
3. Continuous evaluation of clinical performance – **10 marks**
4. End of posting OSCE – **5 marks**
5. Completion of procedures and clinical requirements – **3 marks Total = 30/3 = 10**

IV. SESSIONAL

EXAMINATIONS: 15 marks

Exam pattern:

OSCE – 10 marks (2-3 hours)

DOP – 20 marks (4-5 hours)

{DOP – Directly observed practical in the clinical setting}

Total = 30/2 = 15

Note: For Adult Health Nursing I, Adult Health Nursing II, Community Health Nursing I & Community Health Nursing II, the marks can be calculated as per weightage. Double the weightage as 20 marks for continuous assessment and 30 for sessional exams.

V. COMPETENCY ASSESSMENT: (VIII SEMESTER)

Internal assessment

Clinical performance evaluation – 10 × 5 specialty =

50 marks OSCE = 10 × 5 specialty = 50 marks

Total = 5 specialty × 20 marks = 1

APPENDIX 05

I. UNIVERSITY THEORY QUESTION PAPER PATTERN (For 75 marks)

1. **Section A – 37 marks and Section B – 38 marks**

   a. **Applied Anatomy & Applied Physiology:** Applied Anatomy – Section A and Applied Physiology – Section B,

   b. **Applied Sociology & Applied Psychology:** Applied Sociology – Section A and Applied Psychology – Section B

   c. **Applied Microbiology & Infection Control including Safety:** Applied Microbiology – Section A and Infection Control including Safety – Section B

   Section A (37 marks)

   MCQ – 6 × 1 = 6

   Essay – 1 × 10 = 10

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

   Section B (38 marks) MCQ – 7 × 1 = 7

   Essay – 1 × 10 = 10

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

2. **Section A – 25 marks and Section B – 50 marks**

   Applied Biochemistry & Nutrition & Dietetics: Applied Biochemistry – Section A and Applied Nutrition & Dietetics – Section B

   Section A (25 marks)

   MCQ – 4 × 1 = 4

   Short – 3 × 5 = 15

   Very Short – 3 × 2 = 6

   Section B (50 marks) MCQ – 8 × 1 = 8

   Essay/situation type – 1 × 10 = 10

   Short – 4 × 5 = 20

   Very Short – 6 × 2 = 12

3. **Section A – 38 marks, Section B – 25 marks and Section C – 12 marks**

Pharmacology, Pathology and Genetics: Pharmacology – Section A, Pathology – Section B and Genetics – Section C

Section A (38 marks)

MCQ – 7 × 1 = 7

Essay – 1 × 10 = 10

Short – 3 × 5 = 15

Very Short – 3 × 2 = 6 **Section B (25 marks)**

MCQ – 4 × 1 = 4

Short – 3 × 5 = 15

Very Short – 3 × 2 = 6 **Section C (12 marks)**

MCQ – 3 × 1 = 3

Short – 1 × 5 = 5

Very Short – 2 × 2 = 4

4. **Section A – 55 marks and Section B – 20 marks**

Research and Statistics: Research – Section A and Statistics – Section B

Section A (55 marks)

MCQ – 9 × 1 = 9

Essay/situation type – 2 × 15 = 30

Short – 2 × 5 = 10

Very Short – 3 × 2 = 6 **Section B (20 marks)**

MCQ – 4 × 1 = 4

Short – 2 × 5 = 10

Very Short – 3 × 2 = 6

5. **Marks 75 (For all other university exams with 75 marks)**

MCQ – 12 × 1 = 12

Essay/situation type – 2 × 15 = 30

Short – 5 × 5 = 25

Very Short – 4 × 2 = 8

6. **College Exam (End of Semester) – 50 marks (50/2 = 25 marks)**

MCQ – 8 × 1 = 8

Essay/situation type – 1 × 10 = 10

Short – 4 × 5 = 20

Very Short – 6 × 2 = 12

II. UNIVERSITY PRACTICAL EXAMINATION – 50 marks OSCE – 15 marks

DOP – 35 marks

III. COMPETENCY ASSESSMENT – University Exam (VIII SEMESTER)

Integrated OSCE including all 5 specialties (Stations based on every specialty) = 5 specialty 5 × 20 = 100 marks

Total of 5 Examiners: external – 2 and internal – 3 (One from each specialty)

Internal examiners may be chosen from college faculty with required qualification or from hospital with required qualification

APPENDIX 06

Clinical Logbook for B.Sc. Nursing Program

(Procedural Competencies/Skills)

I & II SEMESTER

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
I SEMESTER						
I	**Communication and Documentation**					
1	Maintaining Communication andinterpersonal relationship with patient and families					
2	Verbal Report					
3	Recording/Documentation of patient care (Written Report)					
II	**Monitoring Vital Signs**					
	Temperature					
4	Oral					
5	Axillary					
6	Rectal					
7	Tympanic					
	Pulse					
8	Radial					
9	Apical					
10	*Respiration*					
11	*Blood Pressure*					
III	**Hot & Cold Application**					
12	Cold Compress					
13	Hot Compress					
14	Ice Cap					
15	Tepid sponge					
IV	**Health Assessment (Basic – First year level)**					
16	Health History					
17	Physical Assessment – General &system wise					
18	Documentation of findings					
V	**Infection Control in Clinical Settings**					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
19	Hand hygiene (Hand washing &Hand rub)					
20	Use of personal and protectiveequipment					
VI	**Comfort**					
21	Open Bed					
22	Occupied Bed					
23	Post-operative Bed					
24	Supine Position					
25	Fowler ‘s Position					
26	Lateral Position					
27	Prone Position					
28	Semi Prone Position					
29	Trendelenburg Position					
30	Lithotomy Position					
31	Changing Position of helplesspatient (Moving/Turning/ Logrolling)					
32	Cardiac table/Over-bed table					
33	Back Rest					
34	Bed Cradle					
35	Pain Assessment (Initial & Reassessment)					
VII	**Safety**					
36	Side rail					
37	Restraint (Physical)					
38	Fall risk assessment & post fallassessment					
VIII	**Admission & Discharge**					
39	Admission					
40	Discharge					
41	Transfer (within hospital)					
IX	**Mobility**					
42	Ambulation					

43	Transferring patient from & to					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
	bed & wheelchair					
44	Transferring patient from & tobed & stretcher					
45	Range of Motion Exercises(ROM)					
X	**Patient Education**					
46	Individual Patient Teaching					
II SEMESTER						
XI	**Hygiene**					
47	Sponge bath/Bed bath					
48	Pressure Injury Assessment					
49	Skin care and care of pressurepoints					
50	Oral hygiene					
51	Hair wash					
52	Pediculosis treatment					
53	Perineal Care/Meatal care					
54	Urinary Catheter care					
XII	**Nursing Process-Basic level**					
55	Assessment and formulatingnursing diagnosis					
56	Planning the nursing Care					
57	Implementation of Care					
58	Evaluation of Care (Reassessment& Modification)					
XIII	**Nutrition & Fluid Balance**					
59	24 Hours Dietary Recall					
60	Planning Well balanced diet					
61	Making fluid plan					
62	Preparation of nasogastric tubefeed					
63	Nasogastric tube feeding					
64	Maintaining intake & output chart					
65	Intra Venous Infusion Plan					

XIV	Elimination					
S.No.	**Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes procedures A/O**	**DATE**		**Signature of the Tutor/Faculty**
				Skill Lab/ Simulation Lab	**Clinical Area**	
66	Providing Bedpan					
67	Providing Urinal					
68	Enema					
69	Bowel Wash					
XV	**Diagnostic Tests-Specimen collection**					
70	Urine Specimen for RoutineAnalysis					
71	Urine Specimen for Culture					
72	Timed urine specimen collection					
73	Feces specimen for routine					
74	Sputum Culture					
	Urine Testing					
75	Ketone					
76	Albumin					
77	Reaction					
78	Specific Gravity					
XVI	**Oxygenation Needs/Promoting Respiration**					
79	Deep Breathing & CoughingExercises					
80	Steam inhalation					
81	Oxygen administration using facemask					
82	Oxygen administration usingnasal prongs					
XVII	**Medication Administration**					
83	Oral Medications					
84	Intramuscular					
85	Subcutaneous					
86	Rectal Suppositories					
XVIII	**Death and Dying**					
87	Death care/Last Office					
XIX	**First Aid and Emergencies**					
	Bandages & Binders					
88	Circular					

S.No.	Procedural Competencies/Skills	Performs independently	Assists/ Observes procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/ Simulation Lab	Clinical Area	
89	Spiral					
90	Reverse Spiral					
91	Recurrent					
92	Spica					
93	Figure of eight					
94	Eye					
95	Ear					
96	Caplin					
97	Jaw					
98	Arm Sling					
99	Abdominal Binder					
	******					
100	Basic CPR (first aid module)					

III & IV SEMESTER

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/Faculty
				Skill Lab/SimulationLab	Clinical Area	
III SEMESTER						
I	**MEDICAL**					
	Intravenous therapy					
1	IV cannulation					
2	IV maintenance & monitoring					
3	Administration of IV medication					
4	Care of patient with CentralLine					
	Preparation, assisting, and after care of patients undergoing diagnostic procedures					
5	Thoracentesis					
6	Abdominal paracentesis					
	Respiratory therapies and monitoring					
7	Administration of oxygen usingventuri mask					
8	Nebulization					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
9	Chest physiotherapy					
10	Postural drainage					
11	Oropharyngeal suctioning					
12	Care of patient with chestdrainage					
	Planning therapeutic diet					
13	High protein diet					
14	Diabetic diet					
	*****					
15	Performing and monitoringGRBS					
16	Insulin administration					
II	**SURGICAL**					
17	Pre-Operative care					
18	Immediate Post-operative care					
19	Post-operative exercise					
20	Pain assessment and management					
	Assisting diagnostic procedures and after care of patients undergoing					
21	Colonoscopy					
22	ERCP					
23	Endoscopy					
24	Liver Biopsy					
	*****					
25	Nasogastric aspiration					
26	Gastrostomy/Jejunostomy feeds					
27	Ileostomy/Colostomy care					
28	Surgical dressing					
29	Suture removal					
30	Surgical soak					
31	Sitz bath					
32	Care of drain					

III	**CARDIOLOGY**					
33	Cardiac monitoring					
34	Recording and interpreting ECG					
35	Arterial blood gas analysis –					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
	interpretation					
36	Administration of cardiac drugs					
37	Preparation and after care ofpatients undergoing cardiac Catheterization					
38	Performing BCLS					
	Collection of blood sample for					
39	Blood grouping/cross matching					
40	Blood sugar					
41	Serum electrolytes					
	*****					
42	Assisting with blood transfusion					
43	Assisting for bone marrowaspiration					
44	Application of antiembolismstockings (TED hose)					
45	Application/maintenance of sequential Compression Device					
IV	**DERMATOLOGY**					
46	Application of topical medication					
47	Intradermal injection-Skin allergytesting					
48	Medicated bath					
V	**COMMUNICABLE**					
49	Intradermal injection-BCG and Tuberculin skin Test or Mantouxtest					
50	Barrier nursing & Reverse barriernursing					

51	Standard precautions-Hand hygiene, use of PPE, needle stickand sharp injury prevention, Cleaning and disinfection, Respiratory hygiene, waste disposal and safe injection practices					
VI	**MUSCULOSKELETAL**					
52	Preparation of patient with Myelogram/CT/MRI					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
53	Assisting with application &removal of POP/Cast					
54	Preparation, assisting and aftercare of patient with Skin traction/skeletal traction					
55	Care of orthotics					
56	Muscle strengthening exercises					
57	Crutch walking					
58	Rehabilitation					
VII	**OR**					
59	Position and draping					
60	Preparation of operation table					
61	Set up of trolley with instrument					
62	Assisting in major and minoroperation					
63	Disinfection and sterilization ofequipment					
64	Scrubbing procedures – Gowning, masking and gloving					
65	Intra operative monitoring					
	IV SEMESTER					
I	**ENT**					
1	History taking and examinationof ear, nose & throat					
2	Application of bandages toEar & Nose					
3	Tracheostomy care					
	Preparation of patient, assisting and monitoring of patients undergoing diagnostic procedures					
4	Auditory screening tests					
5	**Audiometric tests**					
	*****					

6	Preparing and assisting in special procedures like Anterior/posteriornasal packing, Ear Packing and Syringing					
7	Preparation and after care of patients undergoing ENT surgicalprocedures					
8	Instillation of ear/nasal					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
	medication					
II	**EYE**					
9	History taking and examination of eyes andinterpretation					
	Assisting procedures					
10	Visual acuity					
11	Fundoscopy, retinoscopy, ophthalmoscopy, tonometry					
12	Refraction tests					
	*****					
13	Pre and postoperative care of patient undergoing eye surgery					
14	Instillation of eye drops/medication					
15	Eye irrigation					
16	Application of eye bandage					
17	Assisting with foreign bodyremoval					
III	**NEPHROLOGY & UROLOGY**					
18	Assessment of kidney and urinarysystem • History taking and physicalexamination • Testicular self-examination • Digital rectal exam					
	Preparation and assisting with diagnostic and therapeutic procedures					

19	Cystoscopy, Cystometrogram					
20	Contrast studies – IVP					
21	Peritoneal dialysis					
22	Hemodialysis					
23	Lithotripsy					
24	Renal/Prostate Biopsy					
25	Specific tests – Semen analysis,gonorrhea test					
	*****					
26	Catheterization care					
27	Bladder irrigation					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
28	Intake and output recording andmonitoring					
29	Ambulation and exercise					
IV	**BURNS & RECONSTRUCTIVE SURGERY**					
30	Assessment of burns wound					
31	First aid of burns					
32	Fluid & electrolyte replacementtherapy					
33	Skin care					
34	Care of Burn wounds o Bathing o Dressing					
35	Pre-operative and post-operativecare of patient with burns					
36	Caring of skin graft and postcosmetic surgery					
37	Rehabilitation					
V	**NEUROLOGY**					
38	History taking, neurological Examination – EX. Use of Glasgowcoma scale					
39	Continuous monitoring thepatients					
40	Preparation and assisting for various invasive and non- invasive diagnostic procedures					

41	Care of patient undergoing neurosurgery including rehabilitation					
VI	**IMMUNOLOGY**					
42	History taking and Physicalexamination					
43	Immunological status assessment and interpretation of specific test(e.g. HIV)					
44	Care of patient with lowimmunity					
VII	**ONCOLOGY**					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
45	History taking & physical examination of cancer patients					
46	Screening for common cancers ex.TNM classification					
	Preparation, assisting and after care patients undergoing diagnostic procedures					
47	Biopsies/FNAC					
48	Bone-marrow aspiration					
	Preparation of patients and assisting with various modalities of treatment					
49	Chemotherapy					
50	Radiotherapy					
51	Hormonal therapy/ Immunotherapy					
52	Gene therapy/any other					
53	PET scan/Bone scan					
54	Rehabilitation					
VIII	**EMERGENCY**					
55	Practicing triage ‘					
56	Primary and secondary survey inemergency					
57	Examination, investigations & their interpretations, in emergency & disaster situations					
58	Emergency care of medical andtraumatic injury patients					
59	Documentation, and assisting inlegal procedures in emergency unit					

60	Managing crowd					
61	Counseling the patient and familyin dealing with grieving & bereavement					
IX	**CRITICAL CARE**					
62	Assessment of critically illpatients					
63	Assisting with arterial puncture					
64	Assisting with ET tube intubation& extubation					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
65	ABG analysis and interpretation – respiratory acidosis, respiratoryalkalosis, metabolic acidosis, metabolic alkalosis					
66	Setting up of ventilator modes and settings and care of patienton ventilator					
67	Setting up of trolley with instruments/critical care equipment					
68	Monitoring and maintenance ofChest drainage system					
69	Bag and mask ventilation					
70	Assisting with starting and maintenance of Central andperipheral lines invasive					
71	Setting up of infusion pump, anddefibrillator					
72	Administration of drugs via infusion, intracardiac, intrathecal,epidural					
73	Monitoring and maintenance ofpacemaker					
74	ICU care bundle					
75	Management of the dying patientin the ICU					
X	**Geriatric**					
76	History taking and Assessment ofGeriatric patient					
77	Geriatric counseling					

78	Comprehensive Health assessment (adult) after modulecompletion					
V & VI SEMESTER – CHILD HEALTH NURSING I & II						
I	**PEDIATRIC MEDICAL & SURGICAL**					
	Health assessment – Taking history & Physical examination and nutritional assessment of					
1	Neonate					
2	Infant					
3	Toddler					
4	Preschooler					
5	Schooler					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
6	Adolescent					
	Administration of medication/fluids – Calculation, preparation and administration of medication					
7	Oral					
8	I/M					
9	I/V					
10	Intradermal					
11	Subcutaneous					
	*****					
12	Calculation of fluid requirements					
13	Preparation of different strengthsof I/V fluids					
14	Administration of IV fluids					
15	Application of restraints					
	Administration of O_2 inhalation by different methods					
16	Nasal Catheter/Nasal Prong					
17	Mask					
18	Oxygen hood					
	****					
19	Baby bath/sponge bath					
20	Feeding children by Katori &spoon/paladai, cup					
	Collection of specimens for common investigations					
21	Urine					

22	Stool					
23	Blood					
	*****					
24	Assisting with commondiagnostic procedures (Lumbar puncture, bone marrowaspiration)					
	Health education to mothers/parents – Topics					
25	Prevention and management ofMalnutrition					
26	Prevention and management ofdiarrhea (Oral rehydration therapy)					
	*****					
27	Feeding & Complementaryfeeding					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
28	Immunization schedule					
29	Play therapy					
30	Conduct individual and groupplay therapy sessions					
31	Prevention of accidents					
32	Bowel wash					
33	Administration of suppositories					
	Care for ostomies:					
34	Colostomy Irrigation					
35	Ureterostomy					
36	Gastrostomy					
37	Enterostomy					
	*****					
38	Urinary catheterization &drainage					
	Feeding					
39	Naso-gastric					
40	Gastrostomy					
41	Jejunostomy					
	Care of surgical wounds					

42	Dressing					
43	Suture removal					
II	**PEDIATRIC OPD/IMMUNIZATION ROOM**					
	Growth and Developmental assessment of children					
44	Infant					
45	Toddler					
46	Preschooler					
47	Schooler					
48	Adolescent					
	*****					
49	Administration of vaccination					
50	Health/Nutritional education					
III	**NICCU/PICU**					
51	Assessment of newborn					
52	Care of preterm/LBW newborn					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
53	Kangaroo care					
54	Neonatal resuscitation					
55	Assisting in neonatal diagnosticprocedures					
56	Feeding of high-risk newborn –EBM (spoon/paladai)					
57	Insertion/removal/feeding –Naso/oro-gastric tube					
58	Administration of medication –oral/parenteral					
59	Neonatal drug calculation					
60	Assisting in exchange transfusion					
61	Organizing different levels ofneonatal care					
62	Care of a child on ventilator/CPAP					
63	Endotracheal Suction					
64	Chest Physiotherapy					
65	Administration of fluids withinfusion pumps					

66	Total Parenteral Nutrition					
67	Recording & reporting					
68	Cardiopulmonary Resuscitation –PLS					
V & VI SEMESTER – MENTAL HEALTH NURSING I & II						
	PSCHIATRY OPD					
1	History taking					
2	Mental status examination (MSE)					
3	Psychometric assessment (Observe/practice)					
4	Neurological examination					
5	Observing & assisting intherapies					
	Individual and group psycho education					
6	Mental hygiene practiceeducation					
7	Family psycho-education					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of the Tutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
	CHILD GUIDANCE CLINIC					
8	History Taking & mental statusexamination					
9	Psychometric assessment (Observe/practice)					
10	Observing and assisting invarious therapies					
11	Parental teaching for child withmental deficiency					
	IN-PATIENT WARD					
12	History taking					
13	Mental status examination (MSE)					
14	Neurological examination					
15	Assisting in psychometric assessment					
16	Recording therapeutic communication					
17	Administration of medications					
18	Assisting in Electro-convulsiveTherapy (ECT)					

19	Participation in all therapies					
20	Preparation of patients for Activities of Daily living (ADL)					
21	Conducting admission anddischarge counseling					
22	Counseling and teaching patientsand families					
	COMMUNITY PSYCHIATRY & DEADDICTION CENTRE					
23	Conducting home visit and casework					
24	Identification of individuals withmental health problems					
25	Assisting in organizations ofMental Health camp					
26	Conducting awareness meetingsfor mental health & mental illness					
27	Counseling and Teaching familymembers, patients and community					
28	Observation of deaddiction care					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
	V SEMESTER – COMMUNITY HEALTH NURSING I INCLUDING ENVIRONMENTAL SCIENCE & EPIDEMIOLOGY					
1	Interviewing skills (using communication and interpersonalskills)					
2	Conducting community needsassessment/survey					
3	Observation skills					
4	Nutritional assessment skills					
5	Teaching individuals and familieson nutrition-food hygiene and safety, healthy lifestyle and health promotion					
6	BCC (Behaviour change communication) skills					
7	Health assessment including nutritional assessment- differentage groups • Children under five • Adolescent • Woman					

8	Investigating an epidemic –Community health survey					
9	Performing lab tests – Hemoglobin, blood sugar, bloodsmear for malaria, etc.					
10	Screening, diagnosis and primarymanagement of common health problems in the community and referral of high-risk clients (Communicable & NCD)					
11	Documentation skills					
12	Home visit					
13	Participation in national healthprograms					
14	Participation in school healthprograms					
V SEMESTER – EDUCATIONAL TECHNOLOGY/NURSING EDUCATION						
1	Writing learning outcomes					
2	Preparation of lesson plan					
3	Practice Teaching/ Microteaching					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of the Tutor/ Faculty**
				Skill Lab/Simulation Lab	**Clinical Area**	
4	Preparation of teaching aids/media					
	Preparation of assessment tools					
5	Construction of MCQ tests					
6	Preparation of observationchecklist					
VI SEMESTER – NURSING MANAGEMENT & LEADERSHIP						
	Hospital and Nursing Service Department					
1	Preparation of organogram (hospital/nursing department)					
2	Calculation of staffing requirements for a nursingunit/ward					
3	Formulation of Job description ofnursing officer (staff nurse)					
4	Preparation of Patient assignmentplan					
5	Preparation of duty roster for staff/students at different levels					

6	Preparation of logbook/MMF forspecific equipment/ materials					
7	Participation in Inventory controland daily record keeping					
8	Preparation and maintenance ofrecords & reports such as incident reports/adverse reports/audit reports					
9	Participation in performance appraisal/evaluation of nursingstaff					
10	Participate in conducting in- service education for the staff					
	College & Hostel					
11	Preparation of organogram ofcollege					
12	Formulation of job descriptionfor tutor					
13	Participation in performanceappraisal of tutor					
14	Preparation of Master plan, time-table and clinical rotation					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
15	Preparation of student anecdotes					
16	Participation in clinicalevaluation of students					
17	Participation in planning and conducting practical examinationOSCE – end of posting					
VI & VII SEMESTER – MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING I & II						
I	**ANTENATAL CARE**					
	Health assessment of antenatal woman					
1	History Taking including obstetrical score, Calculation ofEDD, gestational age					
2	Physical examination: head tofoot					
3	Obstetrical examination includingLeopards maneuvers & auscultation of Fetal heart sound (fetoscope/stethoscope/ Doppler)					
	Diagnostic tests					

4	Urine pregnancy test/card test					
5	Estimation of hemoglobin usingSahle‘s hemoglobinometer					
6	Advice/assist in HIV/HBsAg/VDRL testing					
7	Preparation of peripheral smearfor malaria					
8	Urine testing for albumin andsugar					
9	Preparation of mother for USG					
10	Kick chart/DFMC (Daily Fetaland Maternal Chart)					
11	Preparation and recording ofCTG/NST					
	*****					
12	Antenatal counseling for each trimester including birth preparedness and complicationreadiness					
13	Childbirth preparation classes forcouples/family					
14	Administration of Td/TT					
15	Prescription of iron & folic acidand calcium tablets					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
II	**INTRANATAL CARE**					
16	Identification and assessment ofwoman in labour					
17	Admission of woman in labour					
18	Performing/assisting CTG					
19	Vaginal examination duringlabour including Clinical pelvimetry					
20	Plotting and interpretation ofpartograph					
21	Preparation for birthing/delivery – physical and psychological					
22	Setting up of the birthingroom/delivery unit and newborn corner/care area					

23	Pain management during labour-non-pharmacological					
24	Supporting normal births/conductnormal childbirth in upright positions/evidence based					
25	Essential newborn care					
26	Basic newborn resuscitation					
27	Management of third stage of labour – Physiologic management/active management(AMTSL)					
28	Examination of placenta					
29	Care during fourth stage oflabour					
30	Initiation of breast feeding andlactation management					
31	Infection prevention duringlabour and newborn care					
III	**POSTNATAL CARE**					
32	Postnatal assessment and care					
33	Perineal/episiotomy care					
34	Breast care					
35	Postnatal counseling-diet,exercise & breast feeding					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of theTutor/ Faculty**
				Skill Lab/Simulation Lab	**Clinical Area**	
36	Preparation for discharge					
IV	**NEWBORN CARE**					
37	Assessment of newborn					
38	Weighing of newborn					
39	Administration of Vitamin K					
40	Neonatal immunization – Administration of BCG, HepatitisB vaccine					
41	Identification of minor disordersof newborn and their management					
V	**CARE OF WOMEN WITH ANTENATAL, INTRANATAL & POSTNATAL COMPLICATIONS**					
42	High risk assessment – identification of antenatal complications such as pre- eclampsia, anemia, GDM, Antepartum hemorrhage etc.					
43	Post abortion care & counseling					

44	Glucose challenge test/GlucoseTolerance test					
45	Identification of fetal distress andits management					
46	Administration of MgSo4					
47	Administration of antenatal corticosteroids for preterm labour					
48	Assisting with Medical inductionof labour					
49	Assist in Surgical induction – stripping and artificial rupture ofmembranes					
50	Episiotomy (only if required) andrepair					
51	Preparation for emergency/elective caesarean section					
52	Assisting in caesarean section					
53	Preparation of mother and assistin vacuum delivery					
54	Identification and assisting in management of malpresentationand malposition during labour					
55	Preparation and assisting in low					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/Simulation Lab	Clinical Area	
	forceps operation					
56	Preparation and assisting in emergency obstetric surgeries					
57	Prescription/administration of fluids and electrolytes throughintravenous route					
	Assisting in procedures					
58	Assisting in Manual removal ofthe placenta					
59	Assisting in Bimanual compression of uterus/Balloontamponade for atonic uterus					
60	Assisting in Aortic compressionfor PPH					
61	Identification and first aid management of PPH & obstetricshock					

62	Assisting in management ofobstetric shock					
63	Identification and assisting in management of puerperal sepsisand administration of antibiotics					
64	Management of breast engorgement and infections					
65	Management of thrombophlebitis					
	HIGH RISK NEWBORN (Some aspects of high risk newborn care are included in Child Health Nursing)					
66	Identification of high-risknewborn					
67	Care of neonate under radiantwarmer					
68	Care of neonate on phototherapy					
69	Referral and transportation ofhigh-risk newborn					
70	Parental counselling – sickneonate and neonatal loss					
	FAMILY WELFARE					
71	Postpartum Family planningcounseling					
72	Postpartum family planning –Insertion and removal of PPIUCD/PAIUCD					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
73	Counselling of the woman forPostpartum sterilization					
74	Preparation and assisting intubectomy					
	OTHER PROCEDURES					
75	Preparation and assisting forD&C/D&E operations					
76	Observation/Assisting in ManualVacuum Aspiration					
77	Assessment of women withgynaecological disorders					
78	Assisting/performing Pap smear					
79	Performing Visual inspection ofcervix with acetic acid					
80	Assisting/observation of cervicalpunch biopsy/ Cystoscopy/Cryosurgery					

81	Assisting in gynecologicalsurgeries					
82	Postoperative care of womanwith gynecological surgeries					
83	Counsel on Breast self-examination					
84	Counseling couples withinfertility					
85	Completion of safe delivery appwith certification					
VII SEMESTER – COMMUNITY HEALTH NURSING II						
1	Screening, diagnosing, management and referral ofclients with common conditions/emergencies					
2	Antenatal and postnatal care at home and health centre					
3	Conduction of normal childbirth& newborn care at health centre					
4	Tracking every pregnancy andfilling up MCP card					
5	Maintenance of records/ registers/reports					
6	Adolescent counseling & participation in youth friendly					

S.No.	**Specific Procedural Competencies/Skills**	**Performs independently**	**Assists/ Observes Procedures A/O**	**DATE**		**Signature of theTutor/ Faculty**
				Skill Lab/SimulationLab	**Clinical Area**	
	services					
7	Counseling for safe abortionservices					
8	Family planning counseling					
9	Distribution of temporary contraceptives – condoms, OCP ‘s, emergency contraceptives, Injectable MPA					
10	Insertion of interval IUCD					
11	Removal of IUCD					
12	Participation in conducting vasectomy/tubectomy camp					

13	Screening, diagnosis, primary management and referral of clients with occupational healthproblems					
14	Health assessment of elderly					
15	Mental Health screening					
16	Participation in community diagnosis – data management					
17	Writing health centre activityreport					
18	Participation in organizing andconducting clinic/health camp					
19	Participation in disaster mockdrills					
20	Co-ordinating with ASHAs and other community health workers					
VII SEMESTER – NURSING RESEARCH & STATISTICS						
	Research Process Exercise					
1	Statement of the problem					
2	Formulation of Objectives &Hypotheses					
3	Literature review of researchreport/article					
4	Annotated bibliography					
5	Preparation of sample researchtool					
	Analysis & Interpretation of data – Descriptive statistics					

S.No.	Specific Procedural Competencies/Skills	Performs independently	Assists/ Observes Procedures A/O	DATE		Signature of theTutor/ Faculty
				Skill Lab/SimulationLab	Clinical Area	
6	Organization of data					
7	Tabulation of data					
8	Graphic representation of data					
9	Tabular presentation of data					
10	Research Project (Group/Individual) Title:					
VIII SEMESTER (INTERNSHIP)						

Note: Maximum of 30% of all skills/procedures can be performed by students in skill lab/simulation lab for all

clinical nursing Courses except Community Health Nursing and Mental Health Nursing in which the percentage allowed is only 10%

* – When the student is found competent to perform the skill, it will be signed by the faculty/tutor.

Students: Students are expected to perform the listed skills/competencies many times until they reach level 3 competency, after which the preceptor signs against each competency.

Preceptors/faculty: Must ensure that the signature is given for each competency only after they reach level 3.

- Level 3 competency denotes that the student is able to perform that competency without supervision
- Level 2 Competency denotes that the student is able to perform each competency with supervision
- Level 1 competency denotes that the student is not able to perform that competency/skill even with supervision

Signature of the Faculty Coordinator **Signature of the HOD/Principal**

APPENDIX 07

CLINICAL REQUIREMENTS

S.No.	Clinical Requirement	Date	Signature of theFaculty
	I & II SEMESTER		
	NURSING FOUNDATION I & II		
1	History Taking -2 1. 2.		
2	Physical Examination -2 1. 2.		
3	Fall risk assessment – 2		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	1. 2.		
4	Pressure Sore Assessment – 21. 2.		
5	Nursing Process – 21. 2.		
6	Completion of first aid module		
7	Completion of Health assessment module		
	III SEMESTER – ADULT HEALTH NURSING I		
	Medical		
1	Care Study – 1		
2	Health education – 1		
3	Clinical presentation/care note – 1		
	Surgical		
4	Care study – 1		
5	Health education – 1		
6	Clinical Presentation/Care note – 1		
	Cardiac		
7	Cardiac assessment – 1		
8	Drug presentation – 1		

	Communicable		
9	Clinical presentation/Care note – 1		
	Musculoskeletal		
10	Clinical presentation/Care note – 1		
	OR		
11	Assist as circulatory nurse- 5 i. ii. iii . iv. v.		
12	Assist as scrub nurse in minor surgery-5 i. ii.		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	iii. iv. v.		
13	Positioning & draping-5 i. ii. iii .iv v.		
14	Assist as scrub nurse in major surgeries 5 i. ii. iii . iv. v.		
15	Completion of BCLS module		
	IV SEMESTER – ADULT HEALTH NURSING II		
	ENT		
1	ENT assessment of an adult-2 i. ii.		
2	Observation and activity report of OPD		

3	Clinical presentation – 1		
4	Drug Book		
	EYE		
5	Eye assessment i. Adult – 1 ii. Geriatric – 1		
6	Patient-teaching – 1		
7	Clinical Presentation– 1		
	NEPHROLOGY & UROLOGY		
8	Assessment of adult – 1 Assessment of Geriatric-1		
9	Drug presentation – 1		
10	Care study/Clinical presentation – 1		
	BURNS AND RECONSTRUCTIVE SURGERY		

S.No.	Clinical Requirement	Date	Signature of theFaculty
11	Burn wound assessment – 1		
12	Clinical presentation – 1		
13	Observation report of Burns unit		
14	Observe cosmetic/reconstructive procedures		
15	Neuro-assessment 2 i ii.		
16	Unconscious patient – 1		
17	Care study/case presentation – 1		
18	Drug presentation – 1		
	IMMUNOLOGY		
19	Assessment of immune status		
20	Teaching of isolation to patient and family care givers		
21	Nutritional management		
22	Care Note – 1		
	ONCOLOGY		
23	Observation report of cancer unit		
24	Assessment of each system cancer patients – 2		
25	Care study/clinical presentation – 1		

26	Pre and post-operative care of patient with various modes of cancer treatment such as chemotherapy, radiation therapy, surgery, BMT, etc. –3(at least) i. ii. ii.		
27	Teaching on BSE to family members		
	EMERGENCY		
28	Primary assessment of adult– 1		
29	Immediate care (IV access establishment, assisting in intubation,suction, etc.)		
30	Use of emergency trolley		
	CRITICAL CARE		
31	Assessment of critically ill i. Adult ii. Geriatric		

S.No.	Clinical Requirement	Date	Signature of theFaculty
32	Care note/Clinical presentation – 1		
	GERIATRIC		
33	Geriatric assessment – 1		
34	Care note/clinical presentation – 1		
35	Fall risk assessment 1		
36	Functional status assessment – 1		
37	Completion of Fundamentals of Prescribing module		
38	Completion of Palliative care module		
V & VI SEMESTER – CHILD HEALTH NURSING I & II			
	Pediatric medical		
1	Nursing care plan – 1		
2	Case presentation – 1		
3	Health talk – 1		
	Surgical		
4	Nursing care plan – 1		
5	Case study/presentation – 1		
	OPD/Immunization Room		

6	Growth and Developmental study: i. Infant – 1 ii. Toddler – 1 iii. Preschooler – 1		
	NICCU/PICU		
7	Newborn assessment – 1		
8	Nursing Care Plan – 1		
9	Kangaroo mother care – 2		
10	Nursing care plan of high-risk newborn – 1		
11	Completion of ENBC module		
12	Completion of FNBC module		
13	Completion of IMNCI module		
14	Completion of PLS module		
V & VI SEMESTER – MENTAL HEALTH NURSING I & II			
	Psychiatry OPD		
1	History taking and Mental status examination2 i.		

S.No.	Clinical Requirement	Date	Signature of theFaculty
	ii.		
2	Health education – 1		
3	Observation report of OPD		
	Child guidance clinic		
4	Case work – 1		
	Inpatient Ward		
5	Case study – 1		
6	Care plan – 2		
7	Clinical presentation1		
8	Process recording 2		
9	Maintain drug book		
	Community psychiatry & Deaddiction Centre		
10	Case work – 1		
11	Observation report on field visits		
12	Visit to deaddiction Centre		

V SEMESTER – COMMUNITY HEALTH NURSING – I INCLUDING ENVIRONMENTAL SCIENCE & EPIDEMIOLOGY			
1	Community needs assessment/survey (Rural/Urban) – 1		
2	Visits to – SC/HWC – PHC – CHC		
3	Observation of nutritional programsAnganwadi		
4	**Observation visits**		
	i. Water purification site and Water quality tests		
	ii. Milk diary		
	iii. Slaughter-house		
	iv. Market		
	v. Sewage disposal site		
	vi. Rain water harvesting		
	vii. Slaughter-house		
5	Nutritional assessment – Adult 1		
6	Individual health teaching – Adult 1		

S.No.	Clinical Requirement	Date	Signature of theFaculty
7	Use of AV aids – flash cards/posters/flannel graphs/flip charts (AnyTwo) i. ii.		
8	Health assessment of i. Woman – 1 ii. Infant/under five child – 1 iii. Adolescent – 1 iv. Adult – 1		
9	Growth monitoring of children under five – 1		
10	Documentation i. Individual records – 1 ii. Family records – 1		
11	Investigation of an epidemic – 1		
12	Screening and primary management of i. Communicable diseases – 1 ii. NCD – 1		

13	Home visits – 2		
14	Participation in national health programs – 2		
15	Participation in school health program – 1		
V SEMESTER – EDUCATIONAL TECHNOLOGY/NURSING EDUCATION			
1	Microteaching – 2 i. Theory – 1 ii. Practical/lab – 1		
2	Field Visit to nursing educational institution – regional/nationalorganization		
VI SEMESTER – NURSING MANAGEMENT & LEADERSHIP			
1	Field visit to Hospital – regional/national organization		
VI & VII SEMESTER – MIDWIFERY/OBSTETRICS AND GYNECOLOGY (OBG) NURSING I & II			
1	Antenatal assessment and care – 20		
2	Postnatal assessment and care – 15		
3	Assessment of labour using partograph – 10		
4	Per vaginal examination – 10		
5	Observing normal childbirths/deliveries– 10		
6	Assisting in conduction of normal childbirth – 10		
7	Conduction of normal deliveries – 10		

S.No.	**Clinical Requirement**	**Date**	**Signature of theFaculty**
8	Assisting in abnormal/instrumental deliveries – 5		
9	Performing placental examination – 5		
10	Episiotomy and suturing (only if indicated)– 3		
11	Assist/observe Insertion of PPIUCD–2		
12	Newborn assessment – 10		
13	Newborn resuscitation – 5		
14	Kangaroo mother care – 2		
	Nursing Care Plan/Clinical presentation with Drug Study		
15	*Antenatal care* Normal (care plan) – 1 High risk (case study/Clinical presentation) – 1		
16	*Intrapartum care* High risk (Clinical presentation) – 1		

17	*Postnatal care* Normal (care plan) – 1 High risk (Clinical presentation) – 1		
18	*Newborn care* Normal (care plan) – 1		
19	Gynecological conditionCare plan – 1		
20	Health talk – individual/group – 2		
21	Counseling mothers and family members		
22	Visit to • Peripheral health facility/Laqshya certified labour room • Infertility Centre (Virtual/videos)		
23	Completion of SBA module		
24	Completion of safe delivery app		
VII SEMESTER – COMMUNITY HEALTH NURSING II			
1	Screening and primary management ofof i. Minor ailments – 2 ii. Emergencies – 1 iii. Dental problems – 1 iv. Eye – 1 v. ENT – 1		
2	Primary management and care based on protocols approved byMOH&FW (Home/health Centre)		

S.No.	Clinical Requirement	Date	Signature of theFaculty
3	Screening and primary management of i. High risk pregnancy ii. High risk neonate		
4	Assessment of i. Antenatal – 1 ii. Intrapartum – 1 iii. Postnatal – 1 iv. Newborn – 1		
5	Conduction of normal childbirth and documentation – 2		
6	Immediate newborn care and documentation – 1		
7	Family planning counseling – 1		
8	Group health education (Rural/urban) – 1		
9	Adolescent counseling– 1		
10	Family case study (Rural/urban) – 1		

11	Screening, diagnosis, primary management and referral of clients withoccupational health problems – 2 i. ii.		
12	Health assessment (physical & nutritional) of elderly – 1		
13	Mental health screening survey – 1		
14	**Group project –** Community diagnosis (data management)		
15	Writing report on health Centre activity – 1		
16	Participation in organizing and conducting under five/antenatalclinic/health camp – 2 i. ii.		
17	Participation in disaster mock drills		
18	Field visits - Biomedical waste management site - AYUSH Centre - Industry - Geriatric home		
19	Report on interaction with MPHW/HV/ASHA/AWWs (Any 2)1. 2.		
VII SEMESTER – NURSING RESEARCH			
1	Research Project – Group/IndividualTitle:		

Signature of the Faculty coordinator **Signature of the HOD/Principal**

Name of ICU	Clinical Condition	Number of days caregiven	Signature of Faculty/Preceptor

Signature of the Faculty Coordinator **Signature of the HOD/Principal**

Department of Civil Engineering

Curriculum Structure (2022 – 2026)

For each theory course the detailed assessment is shown in Table-1:

Internal Assessment		**University Examination**	
Component	**Maximum Marks**	**Component**	**Maximum Marks**
Sessional Test-I	10	Written Examination of 3-Hour duration	60
Sessional Test-II	10		
Assignment-I	05		
Assignment -II	05		
Attendance*	10		
Total	**40**		**60**

Table 1: Detailed weightage of Marks for theory courses, each of 100 marks.

*The marks of Attendance awarded to the student in theory course should be given as per table 2:

S No.	**Percentage of Attendance**	**Marks to be Awarded**	**Remarks**
01	<75%	-Nil-	Student is detained & has to repeat the course
02	75%<80.5%	6	
03	80.5%<-85.5%	7	
04	85.5%<90.5%	8	
05	90.5%<95.5%	9	
03	95.5%≤100%	10	

Table 2: Detailed weightage of Marks for the attendance in theory courses.

For laboratory course the detailed marks distribution is shown in table 3:

Continuous Assessment		**University Examination**	
Component	**Maximum Marks**	**Component**	**Maximum Marks**
Continuous assessment of practical work, timely submission of lab records.	15	Lab experiment/procedure/ writing/tabulation/innovation as applicable	20
Test	05	Viva Voce	05
Attendance**	05		
Total	**25**		**25**

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Table 3: Detailed weightage of Marks for laboratory courses, each of 50 marks.

**The marks of Attendance awarded to the student in Laboratory course should be given as per table 4:

S No.	Percentage of Attendance	Marks to be Awarded	Remarks
01	< 75%	-Nil-	Student is detained & has to repeat the Lab. course
02	75%<90.5%	4	
03	90.5%≤100%	5	

Table 4: Detailed weightage of Marks for the attendance in laboratory courses.

At the end of semester VI students are required to attend an Industrial Training of 4-6 weeks duration, during summer vacations. After the completion of training each student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. The examination of Industrial Training shall be conducted during semester VII examination.

After the university Exam of semester VII every student shall be allotted a Major Project-II pertaining to his/her stream under the supervision of an allotted mentor. Students have to complete their literature-survey and all other requirements and complete the Major Project-II during semester VIII. Depending upon the infrastructure, computing and other laboratories facilities the students shall be offered in house project on campus or they can complete their project work in any organization/institute/industry outside the campus. Major Project-II shall be evaluated externally as per university statues.

Distribution of marks for Major Project are given in below table:

Internal Component	Weightage		External Component	Weightage
Quality of work	100		Dissertation	100
Presentation	50		Presentation	50
Viva Voce	100		Viva Voce	50
Total	**250**			**200**

For evaluation of internal component of Major Project-II a committee consisting of following members be framed:

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(i) Head of the Department
(ii) One/two member(s) nominated by Head
(iii) One member nominated by Principal
(iv) Coordinator of major project/semester

Elective Papers:

- Students have to opt for one departmental elective paper, each from PEC –I and from PEC –I in 6th semester.
- Students have to opt for one departmental elective paper, from each of PEC –III, PEC –IV and from PEC –V in 7th semester.
- They have to opt for one departmental elective paper, from each PEC –VI and other from PEC – VII in 8th semester
- Students have to opt for one open electives from Open Elective-I in 6th Semester and one open electives Open Elective-II in 7thsemester .
- They have to opt for two open elective from any branch of engineering (SOET) in 8th semester.

Major Project-I shall be evaluated internally by a committee framed by the Head of the Department consisting of three to six members

The distribution of marks of Industrial Training of 50 marks is as follow:

Component	Weightage
Industrial Training	10
Practical Work/Fabrication of Model/Drawing/report	10
Response in Viva of the committee	30
Total	**50**

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Department of Civil Engineering

Semester–I

Theory Courses:

Course Code	Title	Marks Distribution			Hours/ week			Credits
		IA	UE	Total Marks	L	T	P	
BSC-CE-121	Mathematics-I	40	60	100	3	1	0	4
ESC-CE-121	Basic Electrical Engineering	40	60	100	3	0	0	3
BSC-CE-122	Engineering Chemistry	40	60	100	3	1	0	4
BSC-CE-123	Engineering Physics	40	60	100	3	1	0	4
MC-CE-121	Environmental Science*	40	60	100	2	0	0	0
ESC-CE-122	Computer Fundamental	40	60	100	3	1	0	4
Total		**200**	**300**	**600**				**19**

Lab Courses:

ESC-CE-131	Basic Electrical Engineering Lab	25	25	50	0	0	2	1
BSC-CE-131	Engineering Chemistry Lab	25	25	50	0	0	2	1
BSC-CE-132	Engineering Physics Lab	25	25	50	0	0	2	1
ESC-CE-132	Engineering Graphics**	40	60	100	3	0	1	3
MC-CE-131	Induction Program***	0	0	0	0	0	0	0
ESC-CE-133	Computer Fundamental Lab	0	0	0	1	0	0	1
Total		**115**	**135**	**250**				**7**
Total (Theory + Lab)		**315**	**435**	**850**				**26**

N.B:* Environmental science course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks.

** The examination pattern of engineering graphics shall be same as of other theory courses.

**** Induction programme is also non-credits and the student has to get at-least minimum pass marks to qualify the subject. The student has to qualify this course by attending the training which will be verified by concerned teacher.

Semester–II

Theory Courses:

Course Code	Title	Marks Distribution			Hours/ week			Credits
		IA	UE	Total Marks	L	T	P	

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BSC-CE-221	Mathematics-II	40	60	100	3	1	0	4
ESC-CE-221	Basic Electronics Engineering	40	60	100	3	0	0	3
ESC-CE-222	Mechanics of Materials	40	60	100	3	0	0	3
HSMC-CE-222	Communication Skills	40	60	100	2	0	0	2
ESC-CE-223	C-Programming	40	60	100	3	1	0	3
MC-CE-221	Indian Constitution*	40	60	100	2	0	0	0
Total		**200**	**300**	**500**				**15**

Lab Courses:

ESC-CE-232	Mechanics of Materials Lab	25	25	50	0	0	2	1
HSMC-CE-231	Communication Skills Lab	25	25	50	0	0	2	1
ESC-CE-231	Basic Electronics Lab	25	25	50	0	0	2	1
ESC-CE-233	C-Programming Lab	25	25	50	0	0	2	1
ESC-CE-234	Workshop Practice	50	0	50	0	0	4	1
Total		**150**	**100**	**250**				**5**
Total (Theory + Lab)		**350**	**400**	**750**				**20**

* N.B: 1. * Indian constitution course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks.

Semester–III

Theory Courses:

Course Code	**Title**	**Marks Distribution**			**Hours/ week**			**Credits**
		IA	**UE**	**Total Marks**	**L**	**T**	**P**	
BSC-CE-321	Mathematics-III	40	60	100	3	1	0	3
PCC-CE-322	Introduction to Solid Mechanics	40	60	100	2	1	0	3
PCC-CE-323	Introduction to Fluid Mechanics	40	60	100	2	1	0	3
PCC-CE-324	Surveying-I	40	60	100	2	1	0	3
PCC-CE-325	Disaster Preparedness & Planning	40	60	100	2	1	0	3
BSC-CE-326	Biology & Life Sciences	40	60	100	2	1	0	3
Total		**240**	**360**	**600**				**18**

Lab Courses:

PCC-CE-331	Solid Mechanics Lab	25	25	50	0	0	2	1

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PCC-CE-332	Fluid Mechanics Lab	25	25	50	0	0	2	1
PCC-CE-333	Surveying-I Lab	25	25	50	0	0	2	1
Total		**75**	**75**	**150**				**3**
Total (Theory + Lab)		**315**	**435**	**750**				**21**

Semester–IV

Theory Courses:

Course Code	Title	Marks Distribution			Hours/ week			Credits
		IA	UE	Total Marks	L	T	P	
BSC-CE -421	Numerical Techniques	40	60	100	3	1	0	3
PCC-CE-422	Theory of Structures	40	60	100	2	1	0	3
PCC-CE-423	Hydraulic Engineering	40	60	100	2	1	0	3
PCC-CE-424	Surveying-II	40	60	100	2	1	0	3
PCC-CE-425	Building Materials & Construction	40	60	100	2	1	0	3
PCC-CE-426	Estimation and Costing	40	60	100	2	1	0	3
Total		**240**	**360**	**600**				**18**

Lab Courses:

PCC-CE-431	Hydraulic Engineering Lab	25	25	50	0	0	2	1
PCC-CE-432	Structural Analysis Lab	25	25	50	0	0	2	1
PCC-CE-433	Surveying-II Lab	25	25	50	0	0	2	1
Total		**75**	**75**	**150**				**3**
Total (Theory + Lab)		**315**	**435**	**750**				**21**

Semester–V

Theory Courses:

Course Code	Title	Marks Distribution			Hours/ week			Credits
		IA	UE	Total Marks	L	T	P	
PCC-CE-521	Geo-technical Engineering	40	60	100	2	1	0	3
PCC-CE-522	Environmental Engineering	40	60	100	2	1	0	3
PCC-CE-523	Design of Concrete Structures	40	60	100	2	1	0	3
PCC-CE-524	Concrete Technology	40	60	100	2	1	0	3

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PCC-CE-525	Hydrology & Water Resources Engineering	40	60	100	2	1	0	3
OEC-CE	OEC-I	40	60	100	2	1	0	3
Total		**240**	**360**	**600**				**18**

Lab Courses:

PCC-CE-531	Industrial Training	25	-	25	0	0	0	1
PCC-CE-532	Geo-technical Engineering Lab	25	25	50	0	0	2	1
PCC-CE-533	Environmental Engineering Lab	25	25	50	0	0	2	1
PCC-CE-534	Civil Engineering Material Lab	25	25	50	0	0	2	1
Total		**100**	**75**	**175**				**4**
Total (Theory + Lab)		**340**	**435**	**775**				**22**

List of courses in Open Elective Course-I (OEC-I)	
OEC-CE-581/PCC-ITE-322	Operating System
OEC-CE-582/PCC-ITE-324	Object Oriented programming System using java
OEC-CE-583PCC-EE-521	Power System-I
OEC-CE-584/PEC-ECE-522	Electronic multimedia Engineering
OEC-CE-585/PCC-CSE-321	Data Structure using c

Semester–VI

Theory Courses:

Course Code	**Title**	**Marks Distribution**			**Hours/ week**			**Credits**
		IA	**UE**	**Total Marks**	**L**	**T**	**P**	
PCC-CE-621	Transportation Engineering	40	60	100	2	1	0	3
PCC-CE-622	Irrigation Engineering	40	60	100	2	1	0	3
PCC-CE-623	Advance Structure Design	40	60	100	2	1	0	3
PEC–CE	PEC-I	40	60	100	2	1	0	3
PEC-CE	PEC-II	40	60	100	2	1	0	3
OEC-CE	OEC-II	40	60	100	2	1	0	3
Total		**240**	**360**	**600**				**18**

Lab Courses:

PCC-CE-631	Transportation Engineering Lab	25	25	50	0	0	2	1

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PCC-CE-632	Survey Camp	50	50	100	0	0	4	2
Total		**75**	**75**	**150**				**3**
Total (Theory + Lab)		**315**	**435**	**750**				**21**

List of courses in Professional Elective Course-I (PEC-I)	
Course Code	**Course Title**
PEC-CE-661	Construction Engineering and Management
PEC-CE-662	Pavement Material and Geometric Design of Highway
PEC-CE-663	Advance Soil Mechanics
PEC-CE-664	Design of Hydraulic Structures
PEC-CE-665	Rural Water supply
PEC-CE-666	Remote sensing & GIS
List of courses in Professional Elective Course-II (PEC-II)	
Course Code	**Course Title**
PEC-CE-667	Engineering Geology
PEC-CE-668	Professional Practice Law and Ethics
PEC-CE-669	Construction Practice and Project Planning
PEC-CE-670	Industrial Waste Treatment
PEC-CE-671	Highway Construction and Pavement Design
PEC-CE-672	Tunnel Engineering
List of courses in Open Elective Course-II (OEC-II)	
Course Code	**Course Title**
OEC-CE-681/PCC-IT-421	Data Base Management System
OEC-CE-683/PCC-EE-423	Electrical Measurement-I
OEC-CE-684/PCC-CSE-622	Computer Graphics &Multimedia
OEC-CE-685/PCC-EE-421	Renewable Energy Sources
OEC-CE-686/PEC-EE-622	Energy Audit & Management
OEC-CE-687/PCC-ECE-423	Analog Communication system
OEC-CE-688/PCC-ECE-627	Non-Conventional Energy Sources

Semester–VII

Theory Courses:

Course Code		**Marks Distribution**	**Hours/ week**	**Credits**

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	Title	IA	UE	Total Marks	L	T	P	
PROJ-CE-721	Major Project-I	40	60	100	0	0	3	3
PCC-CE-722	Design of Steel Structure	40	60	100	2	1	0	3
HSMC-CE-723	EDM	40	60	100	2	1	0	3
PEC-CE	PEC Elective-III	40	60	100	2	1	0	3
PEC-CE	PEC Elective-IV	40	60	100	2	1	0	3
OEC-CE	Open Elective-III	40	60	100	2	1	0	3
Total		**240**	**360**	**600**				**18**

Lab Courses:

PCC-CE-731	Industrial Training	25	-	25	0	0	2	1
PCC-CE-732	STAAD Pro /CAD Lab	25	25	50	0	0	2	1
PCC-CE-733	Seminar	50		50				1
Total		**100**	**-**	**125**				**3**
Total (Theory + Lab)		**340**	**385**	**725**				**21**

List of courses in Professional Elective Course-III (PEC-III)	
Course Code	**Course Title**
PEC-CE-761	Foundation Engineering
PEC-CE-762	Construction Equipment and Automation
PEC-CE-763	Open channel Flow
PEC-CE-764	Rural Construction Technology
PEC-CE-765	Structural Dynamics
PEC-CE-766	Port and Harbour Engineering
PEC-CE-767	Ground Improvement Techniques

List of courses in Professional Elective Course-IV (PEC-IV)	
Course Code	**Course Title**
PEC-CE-768	Prestressed Concrete and Bridge Design
PEC-CE-769	Traffic Engineering and Management
PEC-CE-770	Air and Noise Pollution and Control
PEC-CE-771	Rock Mechanics

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PEC-CE-772	Flood Control and River Engineering
PEC-CE-773	Transport Planning and Management
PEC-CE-774	Solid and Hazardous Management
List of courses in Open Elective Course-III (OEC-III)	
OEC-CE-781/PEC-ECE-727	Optical Communication
OEC-CE-782/PCC-CSE-325	Digital Logic Design
OEC-CE-783/PCC-CSE-523	Java Programming
OEC-CE-784/PEC-CSE-521	Data warehousing & Data Mining
OEC-CE-785/PCC-EE-324	Electrical Engineering Material

Semester–VIII

Theory Courses:

Course Code	Title	Marks Distribution			Hours/ week			Credits
		IA	UE	Total Marks	L	T	P	
PROJ-CE-821	Major Project-II	250	200	450	0	0	12	6
PEC-CE	PEC Elective-V	40	60	100	2	1	0	3
PEC-CE	PEC Elective-VI	40	60	100	2	1	0	3
Total		**330**	**320**	**650**				**12**

List of courses in Professional Elective Course-V (PEC-VI)	
Course Code	**Course Title**
PEC-CE-861	Advance Structure Design
PEC-CE-862	Earthquake Engineering
PEC-CE-863	Ground Water Hydrology
PEC-CE-864	Architecture and Town Planning
List of courses in Professional Elective Course-VI (PEC-VII)	
Course Code	**Course Title**
PEC-CE-865	Geographical Information System and Science
PEC-CE-866	Structural Geology
PEC-CE-867	Water Resources Field Methods
PEC-CE-868	Environmental Impact Assessment

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Semester-I

Course Title: Mathematics-I **Max. Marks: 100**
Course Code: BSC-CE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

COURSE OBJECTIVE: The course is designed to impart elementary knowledge of theory of calculus, linear algebra and sequence & series to engineering students that will serve them to solve various engineering problems.

UNIT-I DIFFERENTIAL CALCULUS: Rolle's Theorem, Mean value theorems, indeterminate forms and L'Hospital's rule; Successive differentiation and Leibnitz's theorem, Taylor's and Maclaurin's series of function of single variable, Expansion of functions of single variable.

UNIT-II

MULTIVARIABLE CALCULUS (DIFFERENTIATION): Limit, continuity and partial derivatives, physical significance of partial derivative, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

UNIT-III

INTEGRAL CALCULUS: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT-IV

SEQUENCES AND SERIES: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

UNIT-V

MATRICES: Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigen values and Eigen vectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

COURSE OUTCOMES: Upon the successful completion of the course, the student will be able to:

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1. Understand the significance of Rolle's Theorem, Mean Value theorem, Taylor's and Maclaurin's series for differentiable functions.
2. Identify the extreme of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.
3. Use basic the integral rules to evaluate both definite and indefinite integrals and apply the same to find areas and volume of revolutions. Apart from these, they have a basic understanding of Beta and Gamma functions.
4. Apply the tools of power series and Fourier series to deal with functions of several variables that are essentials in most branches of engineering.
5. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

TEXT BOOKS

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 2.
D. Zill, Advanced Engineering Mathematics, Jones & Bartlett
3. N. Piskunov, Differential & Integral calculus, Vol-I & II.
4. Jain &Iyengar, Advanced Engineering Mathematics, Narosa Publishers

REFERENCE BOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

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Semester-I

Course Title: Basic Electrical Engineering **Max. Marks: 100**
Course Code: ESC-EE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course has been designed to provide basic knowledge to the students about the principles of electric circuit analysis, electromagnetism and transformers.

Detailed Contents:

Unit-I

Review of Electric Circuits: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance. Capacitance), ohm's law, Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage & current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C Circuit Analysis: Power & energy relations, analysis of series parallel DC circuits, Star-Delta transformations (ΔϒY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Superposition Theorems (D.D Analysis only).

Unit-III

A.C. Circuit Analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-IV

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-V

Basic Electrical Installations: Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcome:

At the end of this course, students will demonstrate the ability

1. To understand the concepts and applications of different laws used in the networks and circuits.
2. To study and analyze the D.C. Circuit and A.C. Circuit with different theorem.
3. To study the concepts related to electromagnetism.

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4. To understand the principle and working of transformers.
5. To study and understand different types of electrical installations.

Text Books/ References:

1. **V. D. Toro**, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
2. **L. S. Bobrow**, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
3. **E. Hughes**, "Electrical and Electronics Technology", Pearson, 2010.
4. **D. P. Kothari and I. J. Nagrath**, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
5. **D. C. Kulshreshtha**, "Basic Electrical Engineering", McGraw Hill, 2009.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester-I

Course Title: Engineering Chemistry **Maximum Marks: 100**
Course Code: BSC-CE-122 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

COURSE OBJECTIVE: The course is designed to familiarizing the students of engineering with Water treatment, polymerization, photochemistry, corrosion and transition metal chemistry.

UNIT-1
WATER TREATMENT: Water quality measurement, Hardness of water, Estimation of hardness of water, Disadvantages of hard water ,Scale and sludge formation; disadvantages, prevention and treatment, Desalination method, reverse osmosis ,Electro dialysis, Domestic water treatment.

UNIT-2
POLYMERISATION: Basic concept of polymerisation, Broad classification and industrial applications (Buna-N, Buna-S, Polyester, Polyethene, Polypropene, Polystyrene,), Thermosetting plastic and its softening, Biodegradable and non-biodegradable wastes.

UNIT 3
PHOTOCHEMISTRY: Photo excitation, Luminescence and types, Norrish-I and Norrish-II reactions, Application examples of photolysis, Photosynthesis Z –Diagram, Chemistry of vision, MRI equipment and procedure of working.

UNIT-4
TRANSITION METAL CHEMISTRY: Structure of organic compounds up to coordination no 6, Isomerism (geometrical, optical, ionisation, linkage and coordination isomerism, bonding in coordination compounds by CFT, VBT. Application of coordination compounds in organic synthesis and Medical fields.

UNIT 5
CEMENT AND LIME: Introduction and types of cement, Manufacture of Portland Cement, Setting and hardening of cement, Introduction and properties of Lime, Setting and hardening of lime.

COURSE OUTCOME: At the end of course, the student will be able to

1. Apply the methods to produce soft water for industrial use and potable water at cheaper cost.
2. Substitute metals with conducting polymers and also produce cheaper bio-degradable polymers to reduce environmental pollution,
3. Apply knowledge about photochemical and photo physical processes and the reactivity of excited states to explain applications in photochemical energy conversion.
4. Understand structure of organic compounds and transition metal compound synthesis,
5. Understand the manufacturing process of cement and lime.

BOOKS RECOMMENDED:

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1. Odion G.G-Principles of Polymerisation, John Wiley and sons.
2. S.S Dara-A Text Book of Engg. Chemistry.
3. B.Sivasankar-Engineering Chemistry, Tata Mc Graw Hill Publication.
4. S.Chand-Practical Manual for Engineering Chemistry.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions
stations at least one from each Unit

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Semester-I

Course Title: Engineering Physics **Maximum Marks: 100**
Course Code: BSC-CE-123 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

COURSE OBJECTIVE: To acquaint students with the fundamentals of vibrations, acoustics and ultrasonic and how they help in mankind by using engineering skills.

UNIT-I

WAVES, OSCILLATIONS AND INTRODUCTION TO ACOUSTICS: Wave motion, its types, Equations of wave motion, Energy and Intensity of a progressive wave, Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves, their detections and applications. A brief introduction to the acoustics of a hall, factors affecting the acoustics of the buildings, Reverberation Period, Sabine's Formula for calculating Reverberation Time.

UNIT-II

ELECTROSTATICS IN A LINEAR DIELECTRIC MEDIUM & MAGNETOSTATICS: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics – Point charge at the centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. Magnetostatics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

UNIT-III

QUANTUM MECHANICS FOR ENGINEERS: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets.

UNIT-IV

APPLYING THE SCHRODINGER EQUATION: Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator.

UNIT-V

OPTICS: Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings. Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra. Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

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COURSE OUTCOMES: At the end of course, the student will be able to

1. Understand the importance of Applied Physics in describing the technology we are using today in different engineering fields
2. Acquired knowledge of Waves, Vibration and acoustics.
3. It helps the students to develop the acoustically good hall.
4. Knowledge of basic Quantum Mechanics can help the students for further research applications as they can be applied to any quantum, mechanical situation to find energy, momentum etc.
5. Acquired knowledge of Optics help the students to know more about propagation of light and wave optics.

SUGGESTED REFERENCE BOOKS:

1. **Pathania K. S. &Khera S. K.,** Waves and Vibration, 2.
Beiser, **Arthur**, Concepts of Modern physics, TMH.
3. **Rangwala** and **Mahajan**, "Electricity and Magnetism", Tata McGraw Hill, 1998
4. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves,
5. **David J. & Cheek**, Fundamentals and application of ultrasonic waves,
6. **Avadhanulu M. N. &Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
7. **Vijaya K. K., Chandralingam S.,** Modern Physics, S. Chand & Co. Ltd, New Delhi
8. **Mani and Mehta**, G.K. "Modern Physics", Affiliated East-West Press Pvt. Ltd., 1998.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student must attempt five questions at least one from each unit.

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Department of Civil Engineering

Semester-I

Course Title: Environmental Science

Maximum Marks: 100

Course Code: MC-CE-121
University Examination: 60

Duration of Exam: 3 hours
Internal Assessment: 40

Credits: 0 [0-0-0]

COURSE OBJECTIVE: This course is designed to make the engineering students to understand the significance of environment and ecology in human survival and growth. It also aims to connect the budding engineers to nature.

UNIT-I

ELEMENTS OF ECOLOGY: Definition, Scope and basic principles of ecology and environment. Biological levels of organization, population, community, ecosystem and biosphere. Climatic factors - Solar radiations, temperature, water and precipitation.

UNIT-II

ENVIRONMENTAL POLLUTION: Types of pollution, Air pollution, Noise pollution, Water pollution, Soil pollution, Thermal pollution, Radiation pollution

UNIT-III

BIOGEOCHEMICAL CYCLES: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Global Oxygen Cycles. Hydrological cycles.

UNIT-IV

SUCCESSION: Concepts of succession, Types of Succession, Trends in succession, Climax and stability, Co-evolution and group selection.

UNIT-V

MAJOR BIOMES OF THE WORLD: Characteristics of terrestrial fresh water and marine ecosystems; Forests, grasslands, lake, river and marine ecosystems of India.

COURSE OUTCOMES: Upon the completion of the course, students will able to:

1. Learn about the environment and ecology.

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2. Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
3. Understand biogeochemical cycles and human contribution in it.
4. Learn succession and various types of succession.
5. Demonstrate the ability to understand the biomes of world and its importance in human survival.

Books Suggested:

1. J.S.Singh, S.P. Singh and S.R. Gupta. 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).
2. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
3. M.H. Rao and H.V.H. Rao. 1998. Air Pollution. Tata McGraw Hill Publication.
4. V.P. Kudesia. 1997. Air Pollution. PragatiPrakashan.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Department of Civil Engineering

Semester-I

Course Title: Computer Fundamental **Maximum Marks: 100**

Course Code: ESC-CE-122 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits: 4 [3-1-0]

Course Objective: This course is provided aiming to achieve a basic knowledge of computer and its programming among engineering students.

Unit-I

Introduction:

History and Generations of Computers, Classification and Applications of Computers. Computer Hardware: Components of a computer system, Input and Output devices, Memory Hierarchy, Primary and Secondary memory. Computer Software, System and Application Software, Utility Programs.

Unit-II

Operating systems:

Functions and types of O/S, DOS commands, BIOS, POST, Booting Process, Computer Virus, Types of Viruses, Use of Antivirus software.

Computer Languages (Machine, Assembly and High level languages), Translators (Assembler, Compiler and Interpreter). Introduction to algorithm and Flow chart:

Unit-III

Number System:

Data Representation, Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Networking: Introduction to networking, Applications, types of computer networks, Network Topology, LAN, MAN, WAN. Networking devices: Hub, switch, router, repeater, and gateway. History of Internet, Internet, extranet and intranet, WWW, E-mail, ISPs, surfing, phishing.

Unit-V

Introduction to HTML: Introduction to HTML. Working of HTML, Creating and loading HTML page, tags, Structure of HTML, Document, Stand Alone Tags, Formatting text, Adding Images, Creating hyper Links, Tables, Sending E-mails through Web Page, Sample web pages.

Course Outcomes:

1. Know the basic components of the computer and working of each device.
2. Understand the functions of Operating System, softwares and DoS Commands.
3. Understand the representation of data in computer.
4. Know the fundamentals of Computer Networking.
5. Know the basics of HTML.

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Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

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Department of Civil Engineering

Semester-I

Course Title: Basic Electrical Engineering Lab
Course Code: ESC-CE-131
Duration of Exam: 2 hours

Maximum Marks: 50
University Examination: 25
Internal Assessment: 25
Credits: 1 [0-0-2]

Course Objective: The lab has been designed to provide and implement basic knowledge about the principles of electric circuit analysis, electromagnetism and transformers to the students.

List of experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin's Theorem & Norton's Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Laboratory Outcomes

1. To study and analyze different circuit elements.
2. To study and implements different laws and theorems of electrical circuits.
3. To make the students aware about the principles and applications of basic electrical laws.
4. To measure the power using two wattmeter method.
5. To study and analyze the phenomenon of Resonance in Series and Parallel circuits

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Semester-I

Course Title: Engineering Chemistry Lab
Course Code: BSC-CE-131
Duration of Exam: 2 hours

Maximum Marks: 50
University Examination: 25
Internal Assessment: 25
Credits: 1 [0-0-2]

COURSE OBJECTIVE: The course is designed to provide experimental foundation for the scientific method for analysis, synthesis and determination of various chemicals.

LIST OF EXPERIMENTS:

1. Acid Base Titrations.
2. Viscosity of Solutions, Determination of composition of sugar solutions from Viscosity.
3. Synthesis of Aspirin.
4. Determination of Functional Groups in Organic Compounds.
5. Synthesis of p-Nitro Aniline from Acetanilide.
6. Conductometric Titrations.
7. Determination of Proteins in given sample of Food.
8. Determination of Flash and Fire Point of a Lubricant.

Laboratory Outcomes

At the end of practical course the students will be familiarized about

1. Titrations and Synthesis of organic compounds,

2. Students are able to determine protein

3. Students are also known to viscosity of solutions

4. Able to know temperature dependent properties of lubricant.

5. Have knowledge of flash and fire point

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Engineering Physics Lab **Maximum Marks: 50**
Course Code: BSC-CE-132 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with experimental apparatus, the scientific method and method of data analysis.

List of Experiments: (Perform any 08) 1.
Measurement of Resistance.
2. Measurement of e/m by Helical method/Thomson's method.
3. Determination of Resistivity of a given wire.
4. Determination of Band Gap of a semiconductor.
7. To determine the refractive index of the prism material using spectrometer.
8. To determine Young's modulus of a bar. 9. To determine the wavelength using Fresnel's bi-prism/diffraction grating. 10. To Determine Plank's Constant.
11. Verify the Stefan's law by incandescent lamp
12. To determine the susceptibility of a ferromagnetic material
13. Study of nano TiO2 solar cell
14. Ultrasound measurement a given liquid
15 Joule's constant experiment
16. Determination of unknown capacitance of a capacitor by de-Sauty bridge method.
17. Refractive index of a glass slab/ water by travelling microscope
18. To determine the frequency of an ac supply by using electrical vibrator
19. To find the inner and outer diameter of a hollow cylinder by using Vernier caliper.
20. To determine the diameter of a thin wire by using screw gauge and its area of crossection.
21. Measurement of 'g' and Time period by using compound pendulum. 22. To find the viscosity of a liquid using stoke's method.

Laboratory Outcomes: On Completion of this course, students are able to –

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.
5. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-I

Course Title: Engineering Graphics **Maximum Marks: 100**
Course Code: ESC-CE-132 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [1-0-4]

Lab. Objective: The course is designed to develop the ability to visualize and communicate three dimensional shapes and train the students to create drawings following the engineering graphics conventions.

UNIT-I

INTRODUCTION TO ENGINEERING GRAPHICS: Engineering drawing as language of Engineers. Drawing instruments and their uses. Projections: The planes of projections, first and thirdangle projections, projection of points lying in any quadrant. Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute;Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

UNIT-II

PROJECTION OF STRAIGHT LINE AND THEIR TRACES: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

UNIT-III

SECTION OF SOLIDS & DEVELOPMENT OF SURFACES: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes.sectional orthographic views of geometrical solids, Purpose of development, , Development of prism, cylinder, cone and pyramid surface

UNIT-IV

ORTHOGRAPHIC PROJECTIONS: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

UNIT-V

ISOMETRIC PROJECTION: Classification of pictorial views, Basic Principle of Isometric projection, Isometric Views of lines, Planes, Simple and compound Solids;, Difference between isometric projection and Isometric view, Isometric projection of solids such as cube, prism, pyramid and cylinder. Introduction to computer aided drafting (CAD)

Lab. Outcomes: On completion of course students must be able

1. To read Engineering Drawing and execute the construction work with the help of available drawing

2. To represent three dimensional objects by two dimensional views.
3. Students must be in a position to show hidden details of objects or underground constructions work by drawing sectional views.
4. Exposure to creating working drawings
5. Exposure to the visual aspects of engineering design

TEXT BOOKS:

1. Bhat, N. D. & Panchal, V. M, *Engineering Drawing*, Charotar Publishers, Anand.
2. Narayana, K. L. &Kannaiah P, *Engineering Graphics*, Tata McGraw Hill, New Delhi.
3. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education 4.Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication.

REFERENCE BOOKS:

1. Gill P. S., *Engineering Graphics and Drafting*, Katria and Sons, Delhi.
2. Luzzadde Warren J., *Fundamentals of Engineering Drawing*, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit. Questions must be set in such a way that the students be able to answer 5 questions within 3 hours

Semester-I

Course Title: Induction Program **Maximum Marks: 0**
Course Code: MC-CE-111 **University Examination: 0**
Credits: 0 [0-0-0] **Internal Assessment: 0**

Induction program

Induction program for students to be offered right at the start of the first year. It should include but not limited to following Activities

1. Physical activity
2. Creative Arts
3. Universal Human Values
4. Literary
5. Proficiency Modules
6. Lectures by Eminent People
7. Visits to local Areas
8. Familiarization to Dept./Branch & Innovations

Semester-I

Course Title: Computer Fundamentals Lab **Max. Marks: 50, Credits: 1[0-0-2]**

Course Code: ESC-CSE-133 **University Examination: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Lab. Objective: The lab has been designed to provide and implement basic knowledge about the computer fundamentals to the students.

List of Experiments:

1. Experiments on dismantling of PC.
    a. Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components.
2. Perform these DOS commands
    a. Internal commands.
    DIR, TYPE, DEL, ERASE, MD, CD, COPY, RMDIR, VER, DATE, TIME, PATH, CLS, RMDIR, VER, DATE, TIME, PATH, CLS, BREAK, SET, EXIT.
    b. External commands.
    APPEND, CHKDISK, ATTRIB, SYS, EDIT.
3. Experiments on system utilities
    a. Explore and describe some system utility like regedit, memory partioning, control panel, window tools.
4. MS-Word: Introduction, Starting MS-Word, MS-Word Screen and its Components, Elementary Working with MS-Word.
5. MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
6. Create a spreadsheet of students, which contains marks obtained by students of a class in different subjects and then calculate maximum, minimum, average and sum of marks in each subject. Also calculate % of each student using functions and formulas in MS-Excel also draw pie chart and bar graph also.
7. MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.
8. Make a simple presentation on your college, use 3D effects, animation on network topologies.
9. Create HTML pages for your business website.
10. Create HTML pages showing timetable of trains departing from Jammu-Tawi railway station.
11. Create web pages for your college.

Lab Outcomes: Upon the completion of course, the students will be able to:

1. Working on various Operating Systems and their usage
2. Understand and use MS-Office to create documents
3. Understand the basic DoS Commands
4. Recognize Hardware components and their assembly
5. Install Operating system on Hardware and working on HTML

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester-II

Course Title: Mathematics-II **Maximum Marks: 100, Credits: 04[3-1-0]**
Course Code: BSC-CE-221 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: This course is designed to impart advanced knowledge of multivariable integration, theory of differential equations and complex variable to engineering students that will serve them to solve real life engineering problems.

Unit- I

Multivariable Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, spheres and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes' (without proofs).

Unit- II

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Second order linear differential equations with variable coefficients, method of variation of parameters.

Unit- III

Partial Differential Equations: Partial differential equations and its formation, Linear and non-linear partial differential equations of first order and their solutions, Charpit's method, Lagrange's method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions, Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables.

Unit- IV

Complex Variable – Differentiation: Differentiation, Cauchy-Riemann equations, analytic functions, elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit- V

Complex Variable – Integration: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem (without proof) and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Course Outcomes: Upon the completion of this course, the students will be able to:

1. Compute double and triple integrals over rectangular and spherical domains and memorize important theorems: Green, Gauss divergence and Stokes with their applications in various engineering problems.
2. Distinguish between linear and non-linear equations. Recognize and solve equations of Bernoulli, Euler and Clairaut.
3. Solve partial differential equations of various kinds and apply the same to solve problems of real world.
4. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.

5. Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.

Text Books

1. **Erwin Kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics**,** Jones & Bartlett.
3. **N. Piskunov,**Differential& Integral calculus, Vol-I & II
4. **Jain &Iyengar**, Advanced Engineering Mathematics, Narosa Publishers

Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
4. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
   J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

SEMESTER-II

Course Title: Basic Electronics Engineering **Maximum Marks: 100**
Course Code: ESC-CE-221 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**
Credits: 3 [2-1-0]

Course Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification of materials and energy band diagram, Semiconductor types, Energy band diagram for Semiconductors, Drift and Diffusion Current, Mass Action Law, Charge Neutrality equations, Current density and Conductivity, Hall Effect.

Unit-II

P-N Junction and applications: Basic structure, PN junction Diodeand Characteristics, Current components in p-n junction, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation& characteristics, CE, CB and CC configurations, Input output characteristics, biasing and bias stability, use of transistor as an amplifier and switch.

Unit-IV

Junction Field Effect Transistors: Operation and characteristics. JFET configurations and biasing. JFET as amplifier

Unit-V:

MOSFET: Types (Depletion and Enhancement), Operation and Characteristics (no derivation), Introduction to MOSFET Scaling and types, Introduction to Short-Channel Effects (V_{TH} roll-off, DIBL, Hot-carrier injection)

Course outcomes: At the end of the course, the student will be able to

1. Describe the energy bands and the scientific principles behind controlled conductivity in semiconductors.
2. Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
3. Analyze the working of the traditional transistor BJT and as well as the concept of biasing.
4. Understand the operation of MOSFET and various issues of scaling in MOSFET.
5. Design basic analog circuits

Text Books:

1. **Millman&Halkias**, Integrated Electronics, TMH
2. **BoylestadandNashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Mehta V. K.**, Electronic Devices, S. Chand and Sons, New Delhi
3. **Sedra& Smith,** Microelectronic Circuits,Oxford Printing Press.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit

SEMESTER-II

Course Title: Mechanics of Materials **Maximum Marks: 100**
Course Code: ESC-CE-222 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Objective: This course has been designed to make the students acquainted about forces and its effects, kinematics and statics.

UNIT-I
Two Dimensional force System:
Basic Concepts, principal of transmissibility, resultant of a force System, Free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, Varrigon theorem, friction, law of friction, equilibrium of body lying on horizontal and inclined plane. Ladder friction applications.

UNIT-II
Member forces in Trusses:
Planer truss structure, trust joint identification, strategy for planer truss analysis, Statistical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of sections)

UNIT-III
Centroid and Centre of gravity:
Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration composite ideas

UNIT-IV
Analysis of stress and strains:
Forces and stress normal stress and strain under axial loading, ultimate and allowable stresses, mechanical properties, Hooke's law, modulus of elasticity. Factor of safety, deformation of members under axial loading, thermal stresses, Poisson's ratio multi axial loading, bulk modulus, shearing Strain, Relation among shear modulus, Young's Modulus and Bulk Modulus.

UNIT-V
Theory of Vibrations:
Difference between static loading and dynamic loading - Degree of freedom - idealisation of structure as single degree of freedom system - Formulation of Equations of motion of SDOF system D'Alemberts principles - effect of damping free and forced vibration of damped and undamped structures - Response to harmonic and periodic forces.

Course Out-come: Upon successful completion of the course, student should be able to:

1. Understand and determine the engineering properties for metals and non-metals.
2. Understand basic concepts of centroid and center of gravity of various sections and deformation in bars
3. To understand the various type of truss and their analysis by various method
4. To understand the principal stresses and strains and their transformation by analytical and graphical
5. Understand the concepts of shear force, bending moment, axial force for statically determinate beams

Text Books:

- Engineering Mechanics of Solids By E.P. Popov, Pearson Education.
- Solid Mechanics by S.M.A. Kazimi, TataMcGRAW HIL
- Mechanic of Materials by R.C. Hibbeler, Pearsons.

Reference Books:

- Mechanics of Materials by Beer &Jonhston, Dewolf, McGRAW HILL.
- Strength of Materials by S. Timoshenko
- Strength of Materials by R. K. Rajput

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

SEMESTER-II

Course Title: Communication Skills **Maximum Marks: 100**
Course Code: HSMC-CE-221 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 2 [2-0-0]

Objective: This subject is designed to attain the general proficiency in English language for the engineering students.

UNIT-I

Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives., Synonyms, antonyms, and standard abbreviations.

UNIT-II

Basic Writing Skills: Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely.

UNIT-III

Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Articles, Prepositions, Redundancies and Clichés.

UNIT-IV

Describing, Defining, Classifying, Providing examples or evidence, writing introduction and conclusion.

UNIT-V

Writing Practices: Comprehension**,** Précis Writing**,** Essay Writing

Course Outcomes: Upon the completion of the course, the students will be able:

1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. To make the students authoritative in self-expression in their day to day life in this fast-changing world.
3. To identify the common errors involved in writing.
4. To understand the nature and style of sensible writing.
5. To write effective and coherent paragraphs.

TEXT BOOKS

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
4. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
5. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan, OUP. 1995.
2. Remedial English Grammar, F.T. Wood, Macmillan.2007
3. On Writing Well, William Zinsser, Harper Resource Book. 2001
4. Study Writing, Liz Hamp-Lyons and Ben Heasly, Cambridge University Press, 2006.

SEMESTER-II

Course Title: C-Programming **Maximum Marks: 100**
Course Code: ESC-CE-223 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: This course is provided aiming to enhance the logical skills of engineering students with the basic programming concepts and implementation in C Programming.

UNIT I

Introduction to C Programming: Overview of programming languages, algorithms and flowcharts, History of C, Structure of a C Program, Compiling & Executing a C program. Constants, Variables and Data Types, Storage classes, Operators and Expressions, Data Input and Output.

UNIT II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Looping: while statement, do-while statement, for statement.

UNIT III

Introduction to arrays: One dimensional array, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, strings, basic string operations**.**
User defined data types: Structure, Defining structures, Array of Structures, Introduction to Union and enumerated data types.

UNIT IV

Functions: Introduction to Function, Types of functions, function declaration, calling a function, passing arguments to functions, passing arrays to functions, Recursion.

UNIT V

Introduction to Pointers & Files: Operations on pointer, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Introduction to File, Operations on files: open, close, read and write.

COURSE OUTCOMES:

The student will be able:

1. To translate the algorithms and flowcharts to programs (in C language) for execution.
2. To make the usage of various control statements for developing an efficient program to solve the problems.
3. To decompose a complex problem into functions for solving it efficiently.
4. To use the arrays and user defined data types for synthesizing a complete program.
5. To use pointers, files and dynamic memory allocations to perform several operations in programs.

Text Books

1. **Brian Kernighan and Dennis Ritchie**, The C Programming Language-2nd Edition, (Prentice Hall Software)
2. Yashavant P. Kanetkar **,** Let Us C, BPB Publication, 15th Edition.
3. **Gottfried**, Programming with C, TMH.

Reference Books

1. **E. Balaguruswamy**, Programming in ANSI C, Tata McGraw-Hill.
2. **Venugopal**, C Programming, TMH.
3. **Yashwant Kanitkar**, Pointers in C, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questionswill be set from each Unit. The student has to attempt five questions at least one.

Course Title: Indian Constitution

Maximum Marks: 100

Course Code:MC-CE-221 **University Examination: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits: 0 [4-0-0]

OBJECTIVE: The basic purpose of this subject is to make a general awareness about our constitution.

UNIT I

Constitutional Framework: Historical Background, Making of the constitution, Salient features of the Indian Constitution, Preamble to the Constitution, Union and its territory, Citizenship, Fundamental rights, Directive principles of state policy, Fundamental duties, Amendment of the constitution, Basic structure of the constitution.

UNIT II

System Of Government: Parliamentary system, Federal System, Centre-state relations, Inter-state relations, Emergency provisions

UNIT III

Central Government: President, Vice-President, Prime Minister, Central Council of Ministers, Cabinet committees, Parliament, Parliamentary committees, Parliamentary forums, Supreme Court State Government: Governor, Chief Minister, State Council of Ministers, State legislature, High court,
Subordinate Courts, Special status of Jammu and Kashmir, Special provision for some states Local Government: Panchayati raj, Municipalities

UNIT IV

Constitutional Bodies: Election commission, Union Public service commission, State Public Service Commission, Finance Commission, National Commission for SC's, National Commission for ST's, Special officer for Linguistic minorities, Comptroller and auditor general of India, Attorney General of India, Advocate General of India.

UNIT V

Non-Constitutional Bodies: Planning Commission, National Development Council, National Human Rights Commission, State Human Rights Commission, Central Information Commission, State
Information Commission, Central vigilance Commission, Central Bureau of Investigation, Lokpal and Lokayuktas Other Constitutional Dimensions: Co-operative societies, Official Language, Public services, Tribunals, Rights and Liabilities of the Government, Authoritative text of the Constitution in Hindi Language, Special Provision relating to certain classes.

COURSE OUTCOME: Upon the completion of this, the students will able to know:

1. About the constitutional framework.
2. About the government system

3. Various type of government
4. About Constitutional bodies: Election commission, UPSC, SPSC, Commission for ST/SC and many others.
5. Non-constitutional bodies: Planning Commission, NDC, NHRC, SHRC, CBI, Vigilance Commission and other dimensions of constitution.

Books Recommended:

1. Indian Constitutional Law, M.P. Jain, 7th Edition
2. Introduction to the Constitution of India, B. K. Sharma, PHI

Note For Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-II

Course Title: Mechanics of Materials Lab **Maximum Marks: 50**
Course Code: ESC-CE-232 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. Objectives: The objective of the Engineering mechanics Lab is to perform experiments which are related to Statics and Dynamics Loading in order to understand the behavior of different mechanical equipment's which students study in theory.

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwell hardness testing machine.
5. To very Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Lab. Outcomes: After the completion of lab course students will be-

1. Able to understand different engineering mechanics apparatus.
2. Able to understand the mechanical properties of materials.
3. Able to understand the moment of inertia of various shapes.
4. Get the practical idea of frictional forces.
5. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-II

Course Title: Communication skills Lab **Maximum Marks: 50**
Course Code: HSMC-CE-231 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**
Credits: 1[0-0-2]

Lab. Objective: The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Lab. Outcomes: Upon the completion of the lab, the students will be able to:

1. Developing intellectual, personal and professional abilities.
2. On completion of the course, the students will be accurate in communication.
3. The students will be able to communicate effectively on complex engineering activities with the engineering community and with the society at large.
4. Able to comprehend and write effective reports and design documentation,
5. It will make effective presentations and give and receive clear instructions.

SEMESTER-II

Course Title: Basic Electronics Lab **Maximum Marks: 50**
Course Code: ESC-CE-231 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits: 1[0-0-2]

Lab. Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with basic electronic devices, their applications and characteristics.

List of Experiments:

1. To plot the Resonance curve for a series & parallel resonance.
2. To determine and plot operating characteristics of a PN junction diode.
3. To study the input / output waveforms of Half wave and bridge wave rectifiers.
4. To suppress the ripple in rectifiers using RC filters.
5. To study the clipper and clamper circuits.
6. To study the Zener characteristics and its application as voltage regulator
7. To plot characteristics of transistor in CE/CB configuration
8. To plot characteristics of a BJT.
9. To plot MOSFET characteristics.
10. To study frequency response of RC Coupled Oscillators.

Lab. outcomes: At the end of the course, the student will be able to

1. Describe the energy bands and the scientific principles behind controlled conductivity in semiconductors.
2. Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
3. Analyze the working of the traditional transistor BJT and as well as the concept of biasing.
4. Understand the operation of MOSFET and various issues of scaling in MOSFET.
5. Design basic analog circuits

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-II

Course Title: C-Programming lab **Maximum Marks: 50**
Duration of Exam: 2 Hrs **Internal Marks: 25**
Course code: ESC-CE-233 **University Examination: 25**
Credits: 1[0-0-2]

Lab. Objectives: The course is designed to provide practical foundation for computer programming and to familiarize students with error handling in programming.

List of Experiments:

1. Familiarization with programming environment.
2. Basic programs in Sequential Statement in C
3. Simple computational problems using arithmetic expressions.
4. Problems involving if-then-else structures.
5. Iterative/looping problems e.g., sum of series.
6. Performing operations on 1D Array.
7. Performing operations on 2D Array.
8. Performing operations on String.
9. Programs on Function declaration, definition and calling.
10. Implementation of Mathematical function
11. Programming for solving Numerical methods problems.
12. Programs on Recursive functions.
13. Programs on Pointers and structures.
14. Programs on File operations.

Lab. Outcomes

1. To be able to correct syntax and logical errors as reported by the compilers and run time for basic programs.
2. To be able to write iterative as well as recursive programs using functions as well
3. To be able to represent data in arrays, strings and structures and manipulate through a program
4. To be able to declare pointers of different types and use them in defining self-referential structures.
5. To be able to create, read and write to and from simple text files.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-II

Course Title: Workshop Practice **Maximum Marks: 50**
Course Code: ESC-CE-234 **University Exam: 0**
Duration of Exam: 2 hours **Internal Assessment:50**
Credits 1(0-0-2)

Lab Objective: In this course the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Laboratory Experiments

Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods

1. Fitting operations & power tools
2. Electrical & Electronics
3. Carpentry
4. Plastic moulding, glass cutting
5. Metal casting
6. Welding (arc welding & gas welding), brazing

COURSE OUTCOMES: Upon completion of this course, the students will:

1. Gain knowledge of the different manufacturing processes which are commonly employed in the industry.
2. Able to fabricate components using different materials.
3. Able to cast metal
4. Students again knowledge in wielding.
5. Students again knowledge in Fitting operation.

TEXT BOOKS:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., ―Elements of Workshop Technology‖, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

2. Kalpakjian S. And Steven S. Schmid, ―Manufacturing Engineering and Technology, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, Manufacturing Technology – I‖ Pearson Education, 2008.

4. Roy A. Lindberg, Processes and Materials of Manufacture‖, 4th edition, Prentice Hall India, 1998.

5. Rao P.N., Manufacturing Technology, Vol. I and Vol. II, Tata McGrawHill House,

Note: Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

SEMESTER III

Course Title: Mathematics-III **Max. Marks: 100**
Course Code: BSC-CE-321 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: The course is designed to provide basic knowledge of special functions and transform to engineering students.

Course Objective: The objective of this course is to familiarize the prospective engineers with standard concepts and techniques in continuous transform, discrete transform and statistical techniques that will serve them well in tackling the various problems in the discipline.

Unit-I

Integral Transform-I: Introduction, Laplace transform, Existence theorem, Propertiesand theorem of Laplace transform, Laplace transform of unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integral-differential equations.

Unit-II

Integral Transform-II: Fourier integral, Fourier Sine and Cosine integrals, Complexform of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

Unit-III

Z-Transform: Introduction and definition of z-transform, some standard forms, Linearity property, Damping rule Some standard results, shifting un to the right and to the left, Multiplication by n.Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

Unit-IV

Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables,

Unit-V

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares-fitting of straight lines, second degree parabolas.

Course Outcomes:

After the completion of this course, the students will be able to:

1. Understand the basic concepts and techniques to solve Laplace transform and also learn to apply the same to solve various problems of engineering which are modeled through differential equations
2. Demonstrate the ability to understand the basic concepts and techniques to solve Fourier's transform and also learn to apply the same to find solutions of boundary value problems (BVP).
3. Apply the concepts of the z-transform in solving difference equations and other discreet signal system.
4. Learn the ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
5. Understand the basic ideas of statistics including measures of central tendency, correlation and regression and apply various statistical methods in engineering problems.

Text Books:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **Ross, A:** First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. **Ramana B.V.,** Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010
4. **Veerarajan T.,** Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2010.
5. **W. Feller,**An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
6. **David A. Santos,** Probability: An Introduction, Jones &Bratlett

Note for Paper Setter :-The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

SEMESTER III

Course Title: Introduction to Solid Mechanics **Max. Marks: 100**
Course Code: PCC-CE-322 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: The objective of this course is to acquaint the students about some basic concepts like bending moments, shear force, stresses, slopes and deflections and buckling loads employed for the analysis of civil engineering structural forms.

UNIT-I

Shear force and Bending moment: SF and BM Diagrams for simply supported over-hanged and cantilever beams subjected to moments and varying loads; SF, BM & Torque Diagrams for inclined beams & brackets subjected to concentrated load, udl, moments and varying loads.

Unit-II

Bending in beams: Bending theory, bending equation, bending stresses in rolled steel and built up sections; Shear stresses in beams: shear flow, shear centre, variation of shear stresses in beam cross section. Torsion in circular shaft.

Unit-III

Analysis of Stresses and Strains: **:** tensor notations, equilibrium equations, transformation of stresses, invariants of stress tensor, plane stress condition, principal stresses, maximum shear stress and their planes, Mohr's circle. Transformation of strains, invariants of stain tensor, plane strain condition, principal strains, maximum shear strain and their planes;–Strain relationship.

Unit-IV

Deflection of beams: Direct integration and Macaulay's methods for simply supported and cantilever beams subjected to concentrated loads, uniformly distributed loads, varying loads and moments. Moment area method, conjugate beam method, application of these methods to statically determinate beams & frames.

Unit-V

Columns and struts: Columns and struts subjected to compression and bending, Buckling of long columns. Euler's, Rankine's and Secant formulae. Combined and Direct bending stress.

Course Outcomes:

On completion of the course, the student will be able to:

1. Understand about the Longitudinal and hoop stresses, volumetric strains of Thin and Thick Cylinders;
2. Draw SF and BM Diagrams for simply supported, over-hanged and cantilever beams subjected to moments and various types loads;

3. Understand Bending theory, bending equation, bending stresses in rolled steel and built up sections;
4. Find out Slope and Deflection for simply supported and cantilever beams subjected to moment and various type of beam.
5. Understand the different end conditions of Columns and struts subjected to compression and bending, difference of short and long column, core or kernel of sections.

Text Books:

1. Engineering Mechanics of Solids By E.P. Popov, Pearson Education.
2. Solid Mechanics by S.M.A. Kazimi, Tata Mcgraw Hill.
3. Strength of materials by S. Ramamrutham & N. Narayan, Dhanpat Rai Publishing Company
4. Mechanic of Materials by R.C. Hibbeler, Pearsons

Reference Books:

1. Mechanics of Materials by Beer & Jonhston, Dewolf, Mcgraw Hill.
2. Strength of Materials by R. Subramanian, Oxford University Press
3. Strength of Materials by R. K. Rajput

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER III

Course Title: Introduction to Fluid Mechanics **Maximum Marks: 100**
Course Code: PCC-CE-323 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: The objective of this course is to acquaint the students about the characteristics and behavior of static and flowing fluids and to introduce the students to various concept and applications of hydraulics. At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulics.

Unit-I

Physical Properties of Fluids: Mass density, Weight density, Specific gravity; Viscosity-kinematic viscosity, Units, Newtons law of viscosity; Surface tension- expressions for liquid droplet, hollow bubble & liquid jet Capillarity-expressions for rise/fall; Types of Fluid-Ideal, Real, Newtonian & Non-Newtonian fluids; Types of flows-Laminar & turbulent flows, Steady & unsteady, Uniform & non-uniform, Compressible & incompressible flows, Streamlines, Streak lines & Path lines; Continuity equation & its differential form; Velocity potential and Stream functions.

Unit-II

Fluid Statics: Pressure-absolute, gauge, atmospheric & vacuum pressures; Pascal's law and Pressure variation in a static fluid; Manometers-piezometer, U-tube, Single column and differential U-tube manometers; Total pressure & Centre of pressure on plane and curved submerged surfaces; Buoyancy & Archimedes Principle, Meta-Centre-determination of metacentric height by analytical & experimental methods; Stability of submerged and floating bodies.

Unit-III

Dynamics of Fluid Flow: Euler's equation of motion along streamline and Bernoulli's equation; Flow measurement by Venturimeter & Orificemeter; Momentum of fluid- Impulse-momentum equation, Kinetic & Momentum Correction factors and Moment of momentum equation; Vortex Motion-Free and Forced vortex flows.

Unit-IV

Dimensional Analysis and Similitude: Dimensional homogeneity, Dimensional analysis-Rayleigh method and Buckingham's Pi- theorem; Similitude; Dimensionless numbers; Model Laws-Reynolds and Froude Model laws; Model testing of partially submerged bodies; Distorted models and their scale ratios.

Unit-V

Miscellaneous

Flow around submerged bodies: Drag on a flat plate, cylinder and sphere. Circulation & lift on cylinder. Orifices & Mouthpieces: Flow through large rectangular orifice & external cylindrical mouthpiece. Notches & Weirs: Discharge over rectangular, triangular and trapezoidal notches/weirs.

Course Outcomes: After the completion of the course the students will be able to

1. Understand type of fluid, behavior of fluid, basic concept and theorem used in fluid Mechanics and apply their knowledge of fluid mechanics in addressing problems in Hydraulics.
2. They will possess the skills to solve problems in laminar flow, Turbulent flow, boundary layer thickness calculation and for better understanding of this all application.
3. They will gain knowledge in Types of models, Application of dimensional analysis and model studies to fluid flow problem.
4. The basic of The Laminar Flow and turbulent flow and concept of boundary layer theory
5. The Dimensional analysis and model studies to the flow problems.

Text Books:

1. **Kumar, D. S.,** Fluid Mechanics. Kataria & Sons Publishers, New Delhi, 1998 Ed.
2. **Streter V. L., Wylie, E.B. & Bedford K. W.,** Fluid Mechanics, MGH, 2001 **Reference**

Books:

3. **P.M. Modi and S.M. Seth**, Hydraulics and Fluid Mechanics, Standard Book House
4. **K. Subramanya** ,Theory and Applications of Fluid Mechanics, , Tata McGraw Hill

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER III

Course Title: Surveying -I **Maximum Marks: 100**
Course Code: PCC-CE-324 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: The aim of this course is to make the students aware about science of determining relative positions and elevation of points by various techniques. With the successful completion of the course.

UNIT-I

Introduction: Importance and Principles of Surveying. Types of surveying. Different classification of surveying, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines. Chain Surveying: Chain Surveying principle, Field Equipment, Methods of chaining, Offsets, Corrections in chaining, Obstacles in chain surveying; Degree of accuracy. Tape and chain corrections.

UNIT-II

Compass Surveying: compass survey and its significance, Types of compass, Methods of Compass survey-Traversing and triangulation survey, Closed traverse, Open traverse, Problems on included angles, Local attraction, Problems on local attraction, Magnetic declination, Adjustment of closing error, Advance techniques- Total Station, Horizontal and vertical Curves.

UNIT-III

Plane Table Surveying and Contouring: Plane Table Surveying principle, Field equipments and accessories, Orientation, Advantages and disadvantages of plane tabling, Methods of plane tabling, Two point and Three point problem, Precautions, Accuracy. Definition, uses and characteristics of contours, Contour interval and horizontal equivalent, Methods of contouring. Interpolation, Computation of area and volume by different methods and their comparison.

UNIT-IV

Levelling: An introduction to Levelling Instruments and their types, Temporary adjustment of level, Types of leveling staffs, Types of leveling, differential, reciprocal leveling, profile levelling and cross sectioning. Bench mark & its types, Field book recording, Methods of reduction of levels (Height of instrument and Rise and fall method) Sensitivity of bubble tube. Corrections applied. Digital and Auto Level, Errors in levelling.

UNIT-V

Photogrammetry: Photogrammetry Scale flying height, remote sensing, platform and sensors, visual image interpretation, basics of geographical information system (GIS) and geographical Positioning system (GPS).

Course Outcomes: The course will enable the students to**:**

1. Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities
2. Translate the knowledge gained for the implementation of Civil infrastructure facilities.
3. Identify and calculate the errors in measurements and to develop corrected values for differential level circuits, horizontal distances and angles for open or closed-loop traverses,
4. Operate an automatic level to perform differential and profile leveling; properly record notes; mathematically reduce and check levelling measurements,
5. Effectively communicate with team members during field activities; identify appropriate safety procedures for personal protection; properly handle and use measurement instruments. Be able to identify hazardous environments and take measures to insure one's personal and team safety

Text book:

1. **Bhavikatti, S.S**., Surveying and Levelling, Vol. I and II, I.K. International, 2010
2. **Arora, K.R**., Surveying, Vol-I, II and III, Standard Book House, 2015.
3. **Basak** "Surveying & Levelling" Tata McGraw Hill, New Delhi

Reference book:

4. **Kanetkar, T. P. and Kulkarni, S.V."**Surveying & Levelling" Vols. I & II PVG
5. **P.B. Shahni** ,Surveying & Levelling
6. **Punmia, B.C."**Surveying" Vol. 1&2, Laxmi Publications Pvt. Ltd, New Delhi, 2002.

Note for Paper Setter:-The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each.

SEMESTER III

Course Title: Disaster Preparedness & Planning **Maximum Marks: 100**
Course Code: PCC-CE-325 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences and to ensure skills and abilities to analyze potential effects of disasters and of the strategies and met to deliver public health response to avert these effects.

UNIT: 1

Disaster and Hazards

Definition of vulnerability, risk, capacity, impact, prevention, mitigation. ecological fragility; Factors affecting vulnerability; Sustainable and environmental-friendly recovery; Reconstruction and development.

UNIT: II

Classification of Disasters

Natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.), Causes of natural disasters; Man-made disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills), Causes and concern of man-made disasters.

UNIT III:

Disaster Impacts

Disaster impacts- Global (Climate change), regional (urban disasters) and local- environmental impacts (physical, social, ecological, economic, political, etc.), health impacts, psycho-social issues; demographic aspects (gender, age, special needs), Impact evaluation and analysis.

UNIT IV:

Disaster Risk Reduction: Disaster management cycle phases; prevention, mitigation, preparedness, relief and recovery; Structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; Early warning systems, Post-disaster environmental response, Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT V:

Disasters management and control: Management of natural disasters (Earthquake, flood and drought), Various components and their functions; Man-made disasters (Industrial and nuclear disaster)-management and control, preventives measures, regulatory aspects.

Course Outcomes: At the end of completion of subject students will able to understand:

1. Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
2. Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.
3. Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
4. Capacity to manage the Public Health aspects of the disasters.
5. Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Text Books:

1.http://ndma.gov.in/ (Home page of National Disaster Management Authority). 64

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

Reference Books:

3.Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.

4. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each

SEMESTER III

Course Title: Biology& Life Science **Maximum Marks: 100**
Course Code: PCC-CE-326 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3 (2-1-0)

Course Objective: The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.

Unit I

Basic Cell Biology: Introduction: Methods of Science-Living Organisms: Cells and Cell theory Cell Structure and Function, Genetic information, protein synthesis, and protein structure, Cell metabolism Homoeostasis- Cell growth, reproduction, and differentiation.

Unit II –

Biochemistry and Molecular Aspects of Life: Biological Diversity --Chemistry of life: chemical bonds-Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

Unit III

Enzymes and Industrial Applications: Enzymes: Biological catalysts, Proteases, Carbonic anhydrase, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

Unit IV

Mechanochemistry: Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

Unit V

Nervous System, Immune System, and Cell Signaling: Nervous system--Immune system- General principles of cell signaling

Course Outcomes:

1. Students will understand the Basic of Cell.
2. To familiarize the students with the basic organization of organisms and subsequent building to a living being.
3. To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.
4. To provide knowledge about biological problems that requires engineering expertise to solve them.
5. To provide knowledge Nervous System, Immune System, and Cell Signaling

REFERENCES/ TEXT BOOK

1. **S. ThyagaRajan, N. Selvamurugan, M. P. Rajesh, R. A. Nazeer, Richard W. Thilagaraj, S. Barathi, and M. K. Jaganathan**, "Biology for Engineers," Tata McGraw-Hill, New Delhi, 2012.

2. **Jeremy M. Berg, John L. Tymoczko and Lubert Stryer**, "Biochemistry," W.H. Freeman and Co. Ltd., 6th Ed., 2006.
3. **Robert Weaver**, "Molecular Biology," MCGraw-Hill, 5th Edition, 2012.
4. **Jon Cooper**, "Biosensors A Practical Approach" Bellwether Books, 2004.
5. **Martin Alexander**, "Biodegradation and Bioremediation," Academic Press, 1994.
6. **Kenneth Murphy**, "Janeway's Immunobiology," Garland Science; 8th edition, 2011.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-III

Course Title: Solid Mechanics Lab. **Maximum. Marks: 50**
Course Code: PCC-CE-331 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

1. To determine ultimate tensile stress of a metal.
2. To conduct the compression test and determine the ultimate compression strength.
3. To conduct torsion test on mild steel or cast iron specimen to determine modulus of rigidity.
4. To determine Rockwell and Brinell hardness of mild steel, cast iron and brass specimen.
5. To determine the Modulus of Elasticity for the materials of given beam using deflection method.
6. To verify theoretical Bending Moment by wooden beam apparatus at the section of hinge using various load combination on a simply supported beam using beam apparatus.
7. To study the toughness and energy absorbing property of cast iron and mild steel using Charpy and Izod.
8. To Determine The Euler Buckling Load Experimentally And compare It To The Euler Theory.

Course Outcomes: After the completion of the course the students will be able to

1. Material property like elastic behavior, hardness, toughness and use UTM.
2. Understand the hooks law and plot the graph.
3. Measure the deflections of beam and verify the Maxwell's reciprocal theorem.
4. Understanding the modulus of rigidity of materials.
5. Understanding the impact strength of steel.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-III

Course Title: Fluid Mechanics Lab **Maximum. Marks: 50**
Course Code: PCC-CE-332 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

1. To determine the density of a liquid (Water, oil, petrol)
2. To determine experimentally the Meta-centric height of a ship model.
3. To verify the Archimedes principle experimentally.
4. To verify the Bernoulli's equation experimentally.
5. To determine coefficient of discharge in an Orificemeter.
6. To determine coefficient of discharge in Venturimeter.
7. To determine the coefficients of discharge, velocity and contraction of a rectangular orifice.
8. To determine the coefficients of discharge, velocity & contraction of external cylindrical mouthpiece.
9. To determine the coefficients of discharge, velocity and contraction of a rectangular Notch.
10. To calibrate a sharp crested triangular Weir.

Course Outcomes: After the completion of the course the students will be able to

1. Understand about metacenter and measure metacentric height.
2. Measure the coefficients of contraction, discharge, velocity.
3. Carry out the flow measurements by orificemeter & venturimeter.
4. Understand about the boundary layers.
5. Measure the friction factor for commercial pipes.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-III

Course Title: Surveying Lab **Max. Marks: 50**
Course Code: PCC-CE-333 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

Chain Surveying

1. Ranging/Chaining a line and recording the field book.
2. Setting-out Right Angles using Tape.
3. Taking offsets and setting-out Right Angles using:
   (a) Cross Staff
   (b) Indian Optical Square
4. Testing and Adjustment of Chain.

Compass Surveying

1. Study of Prismatic Compass
2. Field Work in Compass Surveying
3. Measurement of Angles between the lines meeting at a point.
4. Compass Traversing by radiation method.
5.

Plane Table Surveying

1. Study of Equipment
2. Setting-up the plane table- Temporary adjustments.
3. Marking North Direction and Orientation by: I. Magnetic Needle/Trough Compass II. Back-sighting.
4. Plotting a few points by Radiation Method.
5. Plotting a few points by Intersection Method.
6. Plotting a traverse.
7. Two point and three point problem.

Levelling

1. Study of Equipment and levelling staff.
2. Temporary adjustments of level in Field.
3. Field work using levelling Instrument.
4. Taking Staff Readings and.
5. Recording the fielfbook
6. Longitudinal Section of Road/Railway/Canal/Dam
7. Cross Section of a Road/Railway/Canal/Dam.
8. Taking Staff readings on different stations / finding difference of level between them.

Course Outcomes: At the end of experiment student will able to

1. Use the surveying instruments like chain, tape, staff, compass etc
2. Measure angle by compass and plot an area.

3. Use plane table and understand the advantage of plane table surveying.
4. Measure differences elevations.
5. Able to draw and utilize contour plots and calculate volumes for earthwork.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-IV

Course Title: Numerical Techniques **Max. Marks: 100**
Course Code: BSC-CE-421 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3 (3-1-0)

Course Objective: This Course aims at providing the necessary basic concepts of a numerical techniques and give procedures for solving numerically different Kinds of problems occurring in engineering and technology.

Unit-I

Solutions to Algebraic and Transcendental Equations: Solutions to algebraicand transcendental equations by iterative, Bisection, Regula-Falsi, Newton-Raphson methods and Secant Methods.

Unit-II

Interpolation: Finite-differences and operators, Relation between operators, Interpolation with Equal Intervals – Newton's Forward and Backward Difference Formulae, Interpolation with Unequal Intervals – Lagrange's Interpolation – Newton's Divided Difference Interpolation.

Unit-III

Numerical Differentiation & Integration: Introduction to Numerical differentiation and integration, Errors in Numerical differentiation, Trapezoidal rule, Simpson's one-third rule, Simpson's third-eight rule, Boole's rule and Weddle's rule, Newton-Cote integration formula.

Unit-IV

Matrix and Linear System of Equations : Direct Methods: Gauss and Gauss-Jorden method, Crout's Triangularization method, Iterative methods: Gauss –Jacobi and Gauss Seidel method, Newton method for nonlinear simultaneous equations

Unit-V

Numerical Solutions to Ordinary Differential Equations : Numerical solution of ordinary differential equations by Taylor's Series, Picard's method, Euler's method, Modified Euler's method and RungeKutta method of 4^{th} order, Finite-difference method for Boundary value problems

Course Outcomes:

Upon the completion of this course, the students will:

1. Comprehend of the Power of Numerical Techniques, and Ideas.
2. Apply these techniques to problems drawn from Industry, Management and other engineering fields.
3. Demonstrate the ability to solve linear system of equations.
4. Solve various problem of linear differential equation.
5. Able to solve nonlinear differential equations by using numerical methods.

Text Books:

Introductory Methods of Numerical Analysis

1. **Introductory Methods of Numerical Analysis,** S S Sastry, PHI
2. **Numerical Methods in Engineering and Science: (C, and C++, and MATLAB)**, B. S. Grewal, Khanna Publication
3. **Jain, M. K & Iyengar. S.R.K**, numerical method for scientific and engineering computation, 3rd edition, New Age Publishers
4. **Grasselli, M. & Pelinovsky, D**: Numerical Mathematics, Jones & Bratlett

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-IV

Course Title: Theory of Structures **Max. Marks: 100**
Course Code: PCC-CE-422 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3 (2-1-0)

Objective: The objective of this course is to acquaint the students about various methods used to solve indeterminate beams and frames.

Unit-I

Types of Structures: stability and Indeterminacy of structure (rigid & Pin jointed), Arch structures: 3-hinged parabolic & circular arches, thrust, radial shear and bending moment diagram, Analysis of Cable and suspension bridges.

Unit-II

Energy Methods: Strain energy in members: axial loaded members, under bending, under shearing, circular members under torsion; Law of conservation of energy: virtual work, virtual work on rigid body, virtual work on elastic body; Betti's law and Maxwell's law of reciprocal deflection, application of virtual work on beams (application of product integral table); flexural stiffness of beam with far end pinned; Deflection of statically determinate rigid frames.

Unit-III

Deflection of pin jointed plane trusses: Unit load method, Castigliano's theorems, application of Castigliano's theorems to brackets, lamp posts & curved members; Deflection of truss due to temperature variation; fabrication error and camber.

Unit-IV

Introduction of Displacement method of analysis:

Analysis of indeterminate beams & frames (with and without sway) by classical Displacement methods-slope deflection method, moment distribution methods.

Unit-V

Influence line for statistically determinate Structures: Single concentrated load, UDL (shorter and longer than span), two concentrated loads, series of concentrated loads for maximum shear force at a section, BM under a given load, maximum BM at a given section, Absolute maximum shear & moment in beams. Influence Lines for trusses and three hinged arches.

Course Outcomes: Students who successfully complete this course will be able to:

1. Upon compilation of this course students should have acquired adequate knowledge of advanced concepts in strength of materials
2. Able to understand deflection, energy principles, stability criteria, theories of failure, unsymmetrical bending.
3. Able to know the concept of behavior of curved bars and locating shear centre.Influence Line for Statically determinate structures.
4. Influence Lines, Influence Lines for Beams, Qualitative Influence Lines.

5. Influence Lines for trusses and three-hinged arches.

Text Book

1. Mechanics of Materials by R. C. Hibbeler,Pearsons
2. Structural Analysis, by R. C. Hibbeler,Pearsons
3. Structural Analysis by C. S. Reddy, Tata McGrawHill
4. Intermediate Structural Analysis by C. K. Wang, Tata McGrawHill
5. Structural Analysis by Pandit& Gupta, Tata McGrawHill

Reference Books:

1. Structural Analysis, by T.S.,Thandavamoorthy, Oxford Higher Education
2. Civil Engineering Materials by Neil Jackson
3. Strength Of Materials, by Ramamrutham .S, Narayan .R, DhanpatRaiPublishing Company Pvt. Ltd.
4. Strength of Material", Khurmi.R.S, 23rd" edition, S. Chand Limited, New Delhi.
5. Mechanics for Engineers, "Beer and Johnson ,Statics and Dynamics", McGraw Hill.
6. Advanced Mechanics of Materials, Fred B. Seely, James Ohrea Smith, Wiley.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-IV

Course Title: Hydraulic Engineering **Max. Marks: 100**
Course Code: PCC-CE-423 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3 (2-1-0)

Objective: The objective of this course is to acquaint the students with the basic knowledge of flow of fluid in pipes and channels. They are also introduced to hydraulic machines.

Unit-I

Flow through Pipes: Turbulent flow characteristics, Shear stress in turbulent flow-Boussinesq's theory, Reynolds equation and Prandtl mixing length; Universal velocity distribution equation, velocity distribution in smooth and rough pipes, Velocity distribution in terms of average velocity; Major head losses- Darcy-Wiesbach formula, Chezy equation; Minor head losses- Loss of head due to sudden expansion, sudden contraction, Pipe fittings, Pipe bends, Entrance & Exit. Hydraulic gradient & total energy lines, Pipes in series, equivalent pipes, pipes in parallel; Power transmission through pipes.

Unit-II

Flow in Open Channels: Comparison between open channel flow and pipe flow, Classification of flow in open channels, Chezy's formula for discharge through open channel, Most economical section-Rectangular and trapezoidal sections; Specific energy and specific energy curve, Critical depth and critical velocity, Critical, Sub-critical & Super critical flows, Alternate depths. Gradually varied flow, Afflux and back water curve. Hydraulic Jump-expressions for depth & energy loss.

Unit-III

Turbines: Classification of hydraulic turbines, Impulse & Reaction turbines, Pelton turbine-construction, work-done & efficiency; Radial flow reaction turbines- construction, work-done & efficiency, Francis turbine, Axial flow reaction turbines- Kaplan turbine. Draft Tube-types, theory & efficiency. Specific speed, Unit quantities- unit speed, unit discharge & unit power.

Unit-IV

Pumps: Centrifugal pumps -construction & work-done, definition of various heads & efficiencies, Minimum speed for starting a centrifugal pump, Specific speed, Priming. Reciprocating pumps-construction, working, discharge & work-done; Slip and negative slip of a centrifugal pumps. Maximum speed of a reciprocating pump.

Unit-V

Miscellaneous

Water Hammer: Gradual closure of the valve, Quick closure of valve in a rigid pipe, Quick closure of valve in an Elastic pipe and Compressible fluid. Boundary Layer Theory: Description of Boundary Layer, Boundary layer parameters-boundary layer thickness, displacement, momentum & energy thicknesses, Blasius solution for laminar boundary layer flows, Von-Karman momentum integral equation (without derivation); Laminar & turbulent boundary layers in a flat plate, Boundary layer separation.

Course Outcomes: The students will be able to

1. Apply their knowledge of fluid mechanics in addressing problems in flow through pipes.
2. Apply their knowledge of fluid mechanics in addressing problems in open channels.
3. Possess the skills to solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
4. Understand about the pressure diagram and analysis of surge tank.
5. Have knowledge in hydraulic machineries (pumps and turbines).

Text books:

1. **Kumar D. S**, Fluid mechanics, S. K. Kataria & Sons publishers, New Delhi, 1998
2., **P.M. Modi and S.M. Seth**, Hydraulics and Fluid Mechanics, Standard Book House
3. **K. Subramanya** ,Theory and Applications of Fluid Mechanics, , Tata McGraw Hill.
4. **K. Subramanya** ,Open channel Flow, Tata McGraw Hill.

Reference Books:

1. **Garde R. J**, Engineering Fluid Mechanics.
2. **Ranga Raju, K.G,** Flow through Open Channels, TMH Ltd, New Delhi, 1986.
3. **Nigam P.S**, Handbook of Hydropower Engineering.
4. **Deshmukh,M.M.** Water Power Engineering, Dhanpat Rai & Sons, Delhi, 1978.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-IV

Course Title: Surveying-II **Max. Marks: 100**
Course Code: PCC-CE-424 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**
Credits 3 (3-1-0)

Objective: The objective of this course is to acquaint the students about tachometric and Theodolite surveying and will be introduced to setting out works.

UNIT-I

Theodolite Surveying: Different terms used, Construction, Temporary adjustment of transit Theodolite; Angle measurements (horizontal and vertical) Measurement of deflection angle and magnetic bearing, Theodolite traversing-Traverse calculations; Traverse adjustments. Height of objects.

UNIT-II

Tachometry: Tachometry, Determination of Stadia constants, Anallatic lens, Methods of Tachometry, Heights and distances from stadia intercepts; Subtense method, Tangential method; Measurement of distances, Problems.

UNIT-III

Curves: Curves, Elements of simple curve, Types of horizontal curves, Design and setting out of a simple curve, compound curve, Transition curve objectives, requirements and calculation of lengths, Vertical Curves.

UNIT-IV

Geodetic Surveying: Triangulation- principles: Choice of stations, Base line measurements and corrections applied ,Electronic methods of distance measurements, Satellite station, Triangulation adjustments; Spherical excess, Computations of sides of spherical triangles, Basenet.

UNIT-V

Introduction to Remote Sensing: Idealized remote sensing, Basic principles: EM spectrum, Wavelength regions and their applications in remote sensing, Interaction of EM radiation with atmosphere and earth's surface. Platforms and sensors. Applications of remote sensing.

Course Outcomes: At the end of the course, the student will be able to:

1. Theodolite and its use.
2. About tachometric survey.
3. Understand different types of cures and their design.
4. Understand triangulation and their application.
5. Able to know Remote sensing and its applications.

TEXT BOOKS

1. Duggal, S.K." Surveying" Vols. I & II, Tata McGraw Hill, New Delhi,20M
2. Punmia, B.C."Surveying" Vol. 1&2, Laxmi Publications Pvt. Ltd, New Delhi, 2002

BOOKS RECOMMENDED

1. Surveying Vols. I & II by Dr. K.R.Arora
2. Basak "Surveying & Levelling" Tata McGraw Hill, New Delhi
3. Kanetkar, T.P. and Kulkarni, S.V."Surveying & Levelling" Vols. I & II PVG Prakashan, Pune, 1994.

Note for Paper Setter: The Question paper shall comprises of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER-IV

Course Title: Building Materials & Construction **Max. Marks: 100**
Course Code: PCC-CE-425 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3 (2-1-0)

Objective: The objective of this course is to make the students aware about the knowledge of the materials used in buildings and constructional forms like partitions, DPC, floors and roofs etc.

Unit-I

Stones and Bricks: Stones: Classification, requirements of good materials, Querying of stones Testing of stones. Bricks: Classification of bricks, Properties of Conventional bricks, Autoclave aerated blocks (AAC), Fly ash bricks, manufacturing and testing procedures of Conventional bricks, Autoclave aerated blocks (AAC), Fly ash bricks.

Unit-II

Cement and Admixtures: Cements: Grades, Composition, manufacturing of Portland cement, field testing of cement, special types of cements (Introduction only), storage of cement. Admixtures: types (Fly ash, Micro silica, Ground granulated blast-furnace slag (GGBS), Chemical Admixtures etc.), Properties and their suitability, advantages, disadvantages and limitations.

Unit-III

Steel, Timber and Polymers: Steel: Types of steel (Mild Steel, Hard Steel, Stainless Steel, Heat resistance steel, Manganese steel, Magnet Steel), Steel marketable forms of steel. Timber: Classification, Structure, Seasoning and defects. Paints and Varnishes, Constituents of paints, types of paints (oil paint, enamel paint, emulsion paint cement paint), constituents and characteristics of varnishes,Polymers: Classification, properties and applications in civil engineering of Polymeric materials viz. PVC, Polyester, HDPE, and LDPE.

Unit-IV

General Construction: Brick and Stone masonry: Various terms used, types and bonds in brick work. Partition and cavity walls: Types of non-bearing partition, brick partitions, clay block partitions, Gypsum board Partition, timber partitions and glass partitions, construction of masonry cavity walls.

Unit-V

DPC, Floors and Roofs: Dampness: Sources, effects and prevention of dampness, Materials used in damp proofing course. Floors: Components of floor, brick floors, cement concrete floors, terrazzo flooring, mosaic floorings and tiled flooring, Tiles and Terra-cotta: Manufacturing of tiles and terra-cotta (introduction only), types of terra cotta. Doors and Windows: Locations, sizes general types of door movement, various types of doors and windows (definition only). Roofs (Single Roof: Lean-to-roof, Couple roof, Couple closed roof, Collar-beam roof) & terms used in sloping roof: king post truss, queen post truss.

Course Outcomes: After successful completion of the course, student will be able to

1. Identify various construction materials like stone and bricks
2. Know and differentiate elemental properties of construction materials
3. Know about the different types of materials used in construction such as steel timber polymers 4. Demonstrate an appropriate application of construction material.
5. Know about the different components in construction building.

Reference Books:

1. **Surinder Singh**, Engineering Materials
2. **Sharma and koul,** Building Construction
3. **Kulkarni et.el,** Civil Engineering Materials
4. **B.C. Punmia**, Building Construction

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-IV

Course Title: Estimating & Costing **Max. Marks: 100**
Course Code: PCC-CE-426 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3 (2-1-0)

Objective: The aim of this course is to make the students able enough to determine various quantities and the cost of civil engineering projects.

UNIT-I

Estimate & Types of Estimate: Importance, Items of a work and their Units. Types of estimates, viz. preliminary, Plinth are estimate, Cube rate estimate (for buildings), Approximate quantity method estimate, detailed estimate/Item rate estimate, revised estimate, supplementary estimate, bill of quantities and abstract of cost.

UNIT-II

Analysis of Rates: Preparing analysis of rates, labour schedule, material schedule & rate schedule. Analysis of rates - of lime concrete in foundation; Brickwork in Foundation, super structure, R.C.C. work (Beams, Slabs, Columns), Cement Plastering, white washing, earth work in foundation, D.P.C, Steel work for Reinforcement .

UNIT-III

Specifications: General specifications and detailed specifications, Book of specifications, specifications for earth work in foundation, L.C in foundation, R.C.C. work, Brick work, R.B. Work, Wood work in doors, windows. D.P.C, Centering and Shuttering.

UNIT-IV

Methods of Building Estimates: Methods of building estimate-Long-wall, short-wall and centre line methods, Estimation of masonry platform, estimate of a masonry tank, estimate of roof trusses (wooden/steel). Estimate of a single room and two room buildings, estimate of an R.C.C beam and Slab.

UNIT-V

Road Estimating and Valuation: Methods of estimating: earth work, estimate of metallic road Valuation, Methods of valuation,(1:Rental Method, 2:Direct Comparison with the capital value, 3:Valuation based on profit 4: Valuation based on profit, 5: Depreciation method of valuation), Depreciation, Methods of calculating depreciation. Valuation of building-various methods, rent fixation, plinth area requirement**.**

Course Outcomes: After successfully studying this course, students will:

1. Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
2. Able to determine rates of different items in engineering works.
3. Be able to understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.

4. Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
5. Be able to quantify road estimation and valuation.

Text Books:

1. **Dutta B. N :** Estimating and Costing, UBS Publication.
2. **Mahajan S.P, Satya Srakashan:** Civil Estimating, Costing Evaluation & Specifications.
3 **Khanna**: Hand Book of Civil Engineering.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one

SEMESTER IV

Course Title: Hydraulic Engineering Lab
Course Code: PCC-CE-431
Duration of Exams: 2 hours

Max. Marks: 100
University Examination: 25
Internal Assessment: 25
Credit 1 (0-0-2)

List of Practical's:

1. To determine loss coefficients sudden expansion.
2. To determine loss coefficients in sudden contraction.
3. To determine loss coefficients in pipe fittings.
4. To determine coefficient of bend in a pipe.
5. To determine friction factor in a pipe.
6. To determine critical Reynolds number in a pipe flow.
7. To determine Manning's coefficient of roughness N for the bed of a given flume.
8. To study the formation of hydraulic jump.
9. Study of performance characteristics of a Pelton wheel turbine at constant speed.
10. Study of performance characteristics of a centrifugal pump at constant speed.

Course outcomes: End of the course the students will able to

1. Find loss coefficient for various pipe fittings.
2. Understand velocity distribution in a pipe and open channel.
3. Determine Manning's coefficient of roughness N.
4. Measure the hydraulic jump.
5. Able to understand open channel flow.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Department of Civil Engineering

SEMESTER-IV

Course Title: Structural Analysis Lab **Max. Marks: 50**
Course Code: PCC-CE-432 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

Objective: The objective of the Materials Testing Laboratory is to demonstrate the basic principles in the area of strength and mechanics of materials to the undergraduate students through a series of experiments. The objectives of this course are to make students to learn: Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials. Ability to function on multi-disciplinary teams in the area of materials testing. Ability to use the techniques, skills and modern engineering tools necessary for engineering.

Experiments:

1. To verify Moment Area Method for Slope and Deflection using Steel Beam Apparatus
2. To Verify Maxwell's theorem of reciprocal deflection using steel beam apparatus.
3. To determine elastic displacement of curved members
4. To determine the deflection at given joint of the truss analytically and verify the same experimentally.
5. To Verify the Maxwell's theorem of reciprocal deflection by means of truss.
6. To determine horizontal thrust in a three hinged in a three hinged arc experimentally and verify with theoretical values
7. To obtain influence line diagram (ILD) from horizontal thrust in a three hinged arch experimentally and compare theoretically.

Course Outcomes: After successful completion of the course, the students will be able to:

1. Understand the concept of Moment area method to find slopes and deflection.
2. Understand Verify Maxwell's theorem of reciprocal deflection.
3. Understand elastic displacement of curved members
4. Determine deflection at given joint of the truss
5. Understand Maxwell's theorem of reciprocal deflection by means of truss.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Department of Civil Engineering

SEMESTER-IV

Course Title: Surveying-II Lab **Max. Marks: 50**
Course Code: PCC-CE – 433 **University Examination: 25**
Duration of Exams: 2 hours **Sessional Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

A. THEODOLITE SURVEYING

1. Study of Equipment:

   I. Ordinary Theodolites

   II. EDM Theodolites.

   III. GTS Theodolites.

2. Temporary Adjustments of a Theodolite.

3. Field work using a Theodolite.

   I. Measurement of Horizontal and vertical angles by ordinary and electronic theodolites.

   II. Measurement of linear and angular measurements using EDM/GTS instruments.(basic introduction).

   III. Measurement if magnetic bearing.

B. TACHEOMETRIC SURVEYING

1. Study of equipment and graduated staff.

2. Temporary adjustments

3. Field work:

I. Determination of constants "k & C"

II. Stadia traversing & recording stadia field book.

III. Location of Details by Tachometric methods.

4. Substance Bar Method: Theory and Field work

Course Outcomes: On completion of this course, the students will be able to

1. Able to understand different types of Theodolite and its use.
2. Understand about theodolite and its use.
3. Perform Tachometric surveying in the field.
4. Able to determine constant like K and C
5. Able to know stadia traversing.

Department of Civil Engineering

SEMESTER-V

Course Title: Geotechnical Engineering **Max. Marks: 100**
Course Code: PCC-CE-521 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: This course aims at giving knowledge about formation of soil and its properties.

UNIT-I

Introduction: Soil and its formation, Types of soils, Various Parameters of Soil and their determination, plasticity of soil, Atterberg limits, flow & toughness indices, definitions of activity and sensitivity. Use of consistency limits. Classification of Soils-Introduction of soil classification: particle size classification, textural classification, unified soil classification system, Indian standard soil classification system. Identification: Index property of soil, typical characteristics of soil in different groups.

UNIT-II

Permeability of Soil and Effective Stress principal- Darcy's law and its assumptions, Determination of coefficient of permeability: Laboratory methods, Seepage Analysis, stream and potential functions. Effective Stress, Principle, nature of effective stress, effect of water table. Fluctuations of effective stress, effective stress in soils saturated by capillary action, quick sand condition.

UNIT-III

Compaction of Soil and Stresses in Soil- Theory of compaction, laboratory determination of optimum moisture content and maximum dry density. Compaction in field, compaction specifications and field control. Stresses in soils due to several types of loads, Influence factors, Isobars, Boussinesq's equation, Westerguard theory, Newmark's Influence Chart.

UNIT-IV

Consolidation of Soil – Theory of consolidation, comparison between compaction and consolidation, Components of settlement – Immediate and consolidation settlement – Factors influencing settlement – Terzaghi's one dimensional consolidation theory – Computation of rate of settlement. – $\sqrt{t}$ and log t methods. e-log p relationship consolidation settlement N-C clays – O.C clays – Computation.

UNIT-V

Shear Strength- of cohesive and cohesion less soils – Mohr-Coulomb failure theory – shear strength – Direct shear, Triaxial compression, UCC and Vane shear tests – Pore pressure parameters – Factors influences shear strength of soil.

Course Outcomes: After successfully studying this course, students will:

1. Understand the different types of soil based on their formation mechanism and understand the various phase diagrams and derive various phase relationships of the soil.

2. Understand the physical significance of effective stress and its relation with pore Pressure and Plot various stress distribution diagrams along the depth of the soil mass
3. Understand field compaction and different stresses in soil due to different types of loadings.
4. Understand about theory of consolidation and soil settlements.
5. Understand the shear strength parameters of soil and different types of shear strength tests on soil.

Text Books: -

1. Fundamentals of Geotechnical Engineering by Bajra M. Das
2. Soil Mechanics and Foundation Engineering by K.R Arora

Reference Books: -

1. Principles of soil Mechanics by D.W.Taylor
2. Soil Mechanics by Terzaghi& Peck
3. Soil Mechanics by Witman & Lamb
4. Soil Mechanics by Alam Singh
5. Soil Mechanics by Gopal Ranjan

Note for paper setter: - The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Department of Civil Engineering

SEMESTER-V

Course Title: Environmental Engineering.
Course Code: PCC-CE-522
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Internal Assessment: 40
Credits 3(2-1-0)

Objective: This course aims to make students understand the various aspects of environment and to understand the impact of humans on environment.

UNIT -I

Water quality and treatment: Water demand Residential, Commercial, Institutional, industrial and agricultural, Forecasting of water demand, Sources of Water, water quality parameters, Water quality standards, Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes, Water Supply systems, Components of water supply system, Distribution system, Plumbing and various valves used in water supply systems.

UNIT II

Sewage Characteristics and treatment: Quantity of Sewage, Sewage flow variations, Characteristics and composition of sewage, Pollution due to improper disposal of sewage, Sewerage system and its components, Design of Sewerage system primary, secondary and tertiary treatment of sewage- description of various unit operation and processes, aerobic and anaerobic treatment systems, suspended and attached growth systems, quality requirements (Regulatory standards) for various usages.

UNIT III

Air Pollution and control: Definition of Air pollution, major pollutants- sources and impacts, Air Quality standards, Air pollution meteorology, Plum rise and plum behaviour, Introduction to air quality models and their applications, Monitoring of air pollutants, Control measures.

UNIT IV

Solid waste management- Solid waste, Municipal, industrial and hazardous solid waste, Characteristics and Composition of solid waste, Impact of improper disposal of solid waste, solid waste management, Elements of solid waste management system- generation, collection, transfer and transport, segregation, recycling, reuse, disposal, composting, vermin composting and landfills

UNIT V

Noise pollution and control: Noise pollution, sources (Indoor and outdoor) and impacts, Permissible limits, measurement of noise, Addition of Noise, Noise propagation, control of noise pollution- at source.

Course Outcomes: After successfully studying this course, students will:

1. Understand the impact of humans on environment and environment on humans
2. Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.
3. Be able to plan strategies to control, reduce and monitor pollution.
4. Be able to select the most appropriate technique for the treatment of water, waste water solid waste and contaminated air.
5. Be conversant with basic environmental legislation.

Text books:

1. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg S.K: Water Supply Engineering (Environmental Engineering Vol.–I) 4. Garg S.K: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Reference Books:

1. Modi, P. N;Water supply Engineering. Volume-I
2. Introduction to Environmental Engineering and Science by Gilbert Masters, PrenticeHall, New Jersey.
3. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan,Thompson /Brooks/Cole.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Department of Civil Engineering

SEMESTER-V

Course Title: Design of Concrete Structure **Max. Marks: 100**
Course Code: PCC-CE-523 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The aim of the course is to provide knowledge to the students about design of civil engineering structures like beams, columns, slabs and foundation.

UNIT-I

Introduction: Characteristic strength, stress-strain relationship for concrete and steel, IS specifications (IS 456, 875 and 1893), characteristic imposed loads, DL, EL & WL. Design philosophies – Working stress method and limit state method. Strength and serviceability requirements, Analysis and design for flexure of singly / doubly rectangular and T-beam.

UNIT-II

Beams: Analysis and design for flexure of singly / doubly rectangular and flanged beam sections – by limit state method. Serviceability limit states for deflection and cracking, requirements for curtailments and detailing of reinforcement, minimum / maximum tension and compression reinforcement, minimum and maximum spacing of bars.

UNIT-III

Bond stress: Flexural & anchorage bond stress, design bond stress, development length, anchorage length; Behavior of beams in shear, design for shear & torsion as per limit state method; Reinforcement detailing.

UNIT-IV

One-Way and Two-Way Slabs: Design of one-way and two-slabs with and without corners held down, Staircase (Dog legged), Placement of reinforcement in slabs.

UNIT-V

Columns and Foundations: Design of columns, short and long columns, eccentrically loaded columns. Design of foundation-Isolated and combined footing for columns. All designs to be as per the most recent BIS standards as applicable.

Course Outcomes: After successfully studying this course, students will:

1. Understand the different methods of designing concrete structures.
2. Able to design a beam.
3. Understand the concept of bond stresses in reinforced concrete structures.
4. Able to design one-way slab and two-way slab.
5. Students are able to understand the design of columns and foundation.

Text Books:

1. **Jain A.K**, Design of Reinforced Concrete: Limit State Design.
2. **Sinha**, Design of R.C.C Structures.

Reference Books:

1. **Kong and Evans,** Design of reinforced Concrete and Pre-stressed Concrete Structures.
2. **Karve and Shah**, Design of R.C.C Structures.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Department of Civil Engineering

SEMESTER V

Course Title: Concrete Technology **Max. Marks: 100**
Course Code: PCC-CE-524 **University Examination:**
60 Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: Concrete is the most important civil engineering material, often used with steel reinforcement. The course aims to give details about composition of concrete and its characteristics.

UNIT I

Concrete and its Ingredients: Concrete, Properties of ingredients, tests, Production of concrete, mixing, compaction curing, Properties of fresh concrete, Defects in Concrete, Concrete additives.

UNIT II

Properties of Concrete: Behaviour of concrete in tension and compression, shear and bond, Influence of various factors on test results, Time dependent behaviour of concrete -creep, shrinkage and fatigue.

UNIT III

Concrete Mix Design: Concrete mix design; Proportioning of concrete mixes, basic considerations, cost specifications, factors in the choice of mix proportion, different method of mix design.

UNIT IV

Concrete Operations and transportation: Concrete manufacturing methods(Batching plants) ,transportation(transit mixtures, concrete pumps) ,Quality control, Behavior of concrete in extreme environment; temperature problem in concreting, hot weather, cold weather and under water conditions, Resistance to freezing sulphate and acid attack, efflorescence, fire resistance; Inspection and testing of concrete-Concrete cracking, types of cracks, causes and remedies Non-destructive tests on concrete, Chemical tests on cement and aggregates.

UNIT V

Admixtures and Special Concretes: Admixtures and their uses, Special concrete; types and specifications, Fibre reinforced and steel Fibre reinforced concrete, Polymer concrete, Deterioration of concrete and its prevention Repair and rehabilitation.

Outcome: After successfully studying this course, students will

1. Identify the suitability of materials for the construction works.
2. Able to understand the properties of concrete
3. Able to design the concrete mix design with using different methods of mix design.
4. Implement the special concreting methods required for Cold weather and Hot weather regions.
5. Able to understand the importance of admixture in concrete design.

Text Books:

1. **Neville. A M**: Properties of Concrete.
2. **Kulkarni, PD, Ghosh, RK and Phull, YR**: "Text Book of Concrete Technology"; New Delhi Oxford and IBH Publishing Co.
3. **Gupta BL and Gupta Amit**: "Text Book of Concrete Technology"; Standard Publishers Distributors, Delhi.

Reference Books:

1. **Varshney, RS:**"ConcreteTechnology";New Delhi, Oxford and IBH Publishing
2. **M.S. Shetty**: Concrete Technology.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Department of Civil Engineering

SEMESTER-V

Course Title: Hydrology &Water Resource Engineering **Max. Marks: 100**
Course Code: PCC-CE-525 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The aim of the course is to provide basic knowledge to the students about measurement and occurrence of water and water resource planning.

UNIT I

Precipitation- Hydrologic cycle, water-budget equation, Forms of Precipitation, Measurement of Precipitation, Rain Gauge Network, Test for consistency and continuity of rainfall data, Mean Precipitation over an Area, Intensity-Duration-Frequency analysis, Depth- Area-Duration curves, Probable Maximum Precipitation (PMP).

UNIT II

Abstractions from precipitation- Evaporation process, Measurement, Estimation and Control of Evaporation, Evapo-transpiration, Measurement of Evapo-transpiration, Interception and Depression Storage, Infilitration, Measurement of Infilitration, Infilitration models, Infilitration indices, Runoff, Effective Rainfall.

UNIT III

Stream Flow Measurement and Hydrographs- Methods for measurement of stream flow, stage-discharge relationships, Runoff characteristics, Catchment characteristics, Factors affecting the runoff, yield from a catchment, flow duration curve and flow mass curve. Components of Hydrograph, Base flow separation, Direct runoff hydrograph, Unit hydrograph theory, Derivation of Unit Hydrograph.

UNIT IV

Ground water – Occurrence of Ground Water, Types of aquifers, aquifer properties, Darcys law, Geologic formations of aquifers, steady state flow in wells, unsteady flow in unconfined aquifers, well loses, pumping tests.

UNIT V

Reservoir- Types of Reservoirs, Capacity of Reservoirs, Zones of storage, Mass curve technique, Reservoir flood routing, movement of sediment from watersheds, Sedimentation of reservoirs, life of a reservoir, Erosion and reservoir sedimentation problems in India,

Outcomes: At the end of the course, students are in a position to learn:

1. Various components of hydrologic cycle that affect the movement of water in the earth.
2. Techniques of measurement of precipitation and presentation of rainfall data
3. Concept of abstraction of precipitation and Techniques for measurement of Evaporation, Evapotranspiration, infiltration.
4. The concept of movement of ground water beneath the earth
5. The technical knowhow of reservoirs and the method for determining the storage capacity of reservoirs.

Text Books:

1.G L Asawa, Irrigation Engineering, Wiley Eastern

2. L W Mays, Water Resources Engineering, Wiley.

3. J D Zimmerman, Irrigation, John Wiley & Sons

4. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

Reference Books:

1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.

2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.

3. K Subramanya, Water Resources Engineering through Objective Questions, Tata Mc-Graw Hill.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each

SEMESTER-V

Course Title: Industrial Training **Max. Marks: 25**
Course Code: PCC-CE-531 **University Examination: Nil**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1 (0-0-0)

Details:

At the end of semester IVth and VIth students are required to attend an Industrial Training for 6 weeks duration, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester Vth and VIIth university examination. The examination of Industrial Training shall be conducted during semester Vth and VIIth examination.

Table 3. Distribution of Weightage for Industrial Training of 25 marks.

Component	**Weightage**
Industrial Training	25
Total	**25**

Department of Civil Engineering

SEMESTER-V

Course Title: Geotechnical Engineering Lab **Max. Marks: 50**
Course Code: PCC-CE-532 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

OBJECTIVES:
At the end of the course student attains adequate knowledge in assessing both Physical and Engineering behavior of soils through laboratory testing procedures.

List of Practical's:
1. Determination of Moisture Content
2. Determination of Specific Gravity
3. Field Density Test
4. Grain Size Analysis
A. Sieve Analysis
B. Hydrometer Analysis
5. Determination of Consistency Limits
6. Density Index/Relative Density Test
7. Permeability Test
A. Constant Head Method
B. Falling Head Method
8. Proctor Test
9. Vane Shear Test
10. Direct Shear Test
11. Unconfined Compression Test
12. Undrained Triaxial Test
13. One Dimensional Consolidation Test

Outcomes: Students know the techniques to determine index properties and engineering Properties such as shear strength, compressibility and permeability by conducting appropriate tests.

Note: -These are only the suggested list of experiments. Instructor may add or change some Experiments relevant to the course contents

Department of Civil Engineering

SEMESTER-V

Course Title: Environmental Engineering Lab **Max. Marks: 50**
Course Code: PCC-CE-533 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

Objectives: To understand the sampling and preservation methods and significance of characterization of wastewater.

List of Practical's:

1. Determination of Solids in wastewater sample: Total Solids, Suspended solids, Dissolved solids, Volatile solids, Fixed solids.
2. Determination of Sulphates content.
3. Determination of Ph of Given water sample.
4. Determination of Total Hardness of given water sample.
5. Determination of Biochemical oxygen demand.
6. Determination of Optimum Coagulate Dose.
7. Determination of the moisture content of solid waste.
8. Determination of chloride content of water sample.
9. Determination of SPM and RSPM.
10. Determine the Leq, Lmax and Lmin Noise level.

Laboratory Outcomes:

1. Students will be trained in analytical and conceptual skills required for environmental engineering research.
2. Students will be able to correlate environmental impacts and field processes.
3. Able to determine physico chemical characteristics of water.
4. Able to know air pollution standards.
5. Analyze water and waste water.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Department of Civil Engineering

SEMESTER-V

Course Title: Civil Engineering Material **Max. Marks: 50**
Course Code: PCC-CE-534 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

Objectives:

To prepare the students to effectively link theory with practice and application and to demonstrate background of the theoretical aspects.

List of Practical's:

1. To determine the silt content of fine aggregate
2. To determine the initial and final setting time of a given sample of cement
3. To determine the specific gravity of given sample of fine aggregate.
4. To determine the workability or consistency of concrete mix of given proportion by slump test.
5. To determine the workability of freshly mixed concrete by the of Compacting Factor Test
6. To measure the workability of concrete by vee-bee consistometer test
7. To determine the compressive strength of standard cement mortar cubes
8. To determine the split tensile strength of concrete of given mix proportions
9. To determine the compressive strength of given concrete mixes, 7days,28days,
10. To determine fineness modulus and grade of fine and coarse aggregate of size (10 &20mm)

Outcomes: . Students will able to learn:

1. The behavior and properties of structural materials, e.g. concrete, cement and steel can be better understood by detailed, well-designed, first-hand experience with these materials
2. The students will become familiar with the nature and properties of these materials by conducting laboratory tests.
3. To prepare the students to solve problems including design elements and related to their course work.
4. To encourage the students to use computers in analyzing the data.
5. To emphasize the knowledge and application of safety regulations.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Department of Civil Engineering

SEMESTER-V

List of courses in Open Elective Course-III (OEC-I)

Course Title: Operating System **Max. Marks: 100**

Course Code: OEC-CE-581/PCC-ITE-322 **University Examination: 60**

Duration of Exams: 3 hours **Internal Assessment: 40**

Credits 3(2-1-0)

OBJECTIVES:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

UNIT-1

Introduction: Introduction to Operating System, History of Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods. Operating System Structure: System Components, System Structure.

UNIT-II

Process Management: Process concept, Process states, Principle of Concurrency, Semaphores and its types. Process Scheduling, Process Synchronization, Classical problems in Concurrency, Producer Consumer, Critical Section and readers writers problem, Producer Consumer Problem, Inter Process Communication, Process Generation, Resident Monitors.

UNIT-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System Model, Shared resource, Resource allocation and Scheduling, Resource allocation graph, Deadlock Characterization, Prevention, Detection and Recovery.

UNIT-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base

Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Department of Civil Engineering

UNIT-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISKI/O, Disk Scheduling algorithms and Operating System Design Issues.File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing.Unix and Linux Operating System as case studies, Time OS and Mobile OS

COURSE OUTCOMES: At the end of this course, the students will able to do the following:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

TEXT BOOKS:

1. Milenekovic, Operating System Concepts, McGraw Hill
2. Silverschwatz, Operating System Concepts, Willey & Willey.

REFERENCE BOOKS:

1. Dietel, An introduction to operating system, Addision Wesley.
2. Tannenbaum A. S., Operating system design and implementation, PHI

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Department of Civil Engineering

SEMESTER-V

List of courses in Open Elective Course-III (OEC-I)

Course Title: Object Oriented Programming using Java **Max. Marks: 100**

Course Code: OEC-CE-582/PCC-ITE-324 **University Examination: 60**

Duration of Exams: 3 hours **Internal Assessment: 40**

Credits 3(2-1-0)

OBJECTIVES: To provide a good understanding of Object Oriented Programming Language and its implementation using Java.

UNIT-I

Introduction to Java: Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

UNIT-II

Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

UNIT-III

Inheritance and Polymorphism: Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

UNIT-IV

Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing. Generic programming with templates: Class templates, Function Templates.

UNIT-V

I/O programming & Multithreading: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

Department of Civil Engineering

COURSE OUTCOMES: After taking the course, students will be able to:

1. Understand the basics of java programming.
2. Understand the basic principles of the object-oriented programming.
3. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
4. Design applications with an event-driven graphical user interface.
5. Implement I/O and multithreading in Java

TEXT BOOKS:

1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press
3. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.

REFERENCE BOOKS:

1. Core Java Volume-I Fundamentals., Eight Edition, Horstmann & Cornell, Pearson Education
2. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH
3. Java Programming, D. S. Malik, Cengage Learning

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Department of Civil Engineering

SEMESTER-V

List of courses in Open Elective Course-III (OEC-III)

Course Title: Power System-I **Max. Marks: 100**
Course Code: OEC-CE-583/PCC-EE-521 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The objective of this course is to develop an understanding of the diverse concepts of power system generation, transmission and distribution. It also involves the study of various power transfer methods and phenomenon associated with power system.

Unit-I

Electric Supply System: Typical A.C. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Advantages of High Transmission Voltage, Various Systems of Power Transmission, Economic Choice of Conductor Size, Economic Choice of Transmission Voltage, Requirements of satisfactory electric supply, Main components of Overhead Lines, Conductor Materials, Bundled Conductors, Line Supports, Insulators, Type of Insulators, Potential Distribution over Suspension Insulator, String Efficiency, Methods of Improving String Efficiency, Corona, Factors affecting Corona, Advantages and Disadvantages of Corona, Methods of Reducing Corona Effect, Sag in Overhead Lines, Calculation of Sag, Some Mechanical principles.

Unit-II

Distribution System: Classification of Distribution Systems, Methods of obtaining 3-wire D.C. System, Connection Schemes of Distribution System, Requirements of a Distribution System, Design Considerations in Distribution System. Types of D.C. Distributors, D.C. Distribution Calculations, D.C. distributor fed at one end (concentrated loading), Uniformly loaded distributor fed at one end, Distributor fed at both ends(concentrated loading), Uniformly loaded distributor fed at both ends, Distributor with both concentrated and uniform loading, Ring Distributor, Ring main distributors with Interconnector, 3-wire D.C. system, Current distribution in 3-wire D.C. System, Balancers in 3-wire D.C. system, Booster, Comparison of 3-wire and 2-wire D.C. distribution, Ground detectors. A.C. Distribution Calculations, Methods of solving A.C. Distribution Problems, 3-phase unbalanced loads, 4-wire, star-connected unbalanced loads, Ground detectors.

Unit-III

Line Parameter Calculations: Resistance of a Transmission Line, Skin effect, Flux Linkages, Inductance of a Single Phase Overhead Line, Inductance of a 3-Phase Overhead Line, Concept of self-GMD and mutual GMD, Inductance Formulas in terms of GMD, Electric Potential, Capacitance of a Single Phase Overhead Line, Capacitance of a 3-Phase Overhead Line.

Unit-IV

Classification of overhead Transmission Lines: Performance of Single Phase Short Transmission Lines, Three-Phase Short Transmission Lines, Effect of load p. f. on Regulation and Efficiency, Medium Transmission Lines, End Condenser Method, Nominal T Method, Nominal II Method, Long Transmission Lines, Analysis of Long Transmission Line, Generalised Constants of a Transmission Line, Determination of Generalised Constants for Transmission Lines.

Department of Civil Engineering

Unit-V

Underground Cables: Construction of Cables, Insulating Materials for Cables, Classification of Cables, Cables for 3-PhaseService, Laying of Underground Cables, Insulation Core Cable, Dielectric Stress in a Single Core Cable, Most Economical Conductor Size in a Cable, Grading of Cables, Capacitance Grading, Inter sheath Grading, Capacitance of 3-Core Cables, Measurement of Cc and Ce, Current carrying capacity of underground cables, Thermal resistance, Thermal resistance of dielectric of single-core cable, Permissible current loading, Types of cable faults, Loop tests for location of faults in underground cables, Murray loop test, Varley loop test.

Course Outcome:

At the end of this course, students will demonstrate the ability to

1. Understand the various concept of power system and realize its importance.

2. Understand the working of various distribution systems

3. Understand the various constants of transmission lines

4. Evaluate performance analysis on transmission lines

5. Understand various Underground Cables

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.

2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.

3. **A. R. Bergen and V. Vittal,** "Power System Analysis", Pearson Education Inc., 1999.

4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.

5. **B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac**, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER-V

List of courses in Open Elective Course-III (OEC-III)

Course Title: Electronic Multimedia Engineering **Max Marks: 100**
Course Code: OEC-CE-583/PEC-ECE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies.

Unit-I

Electro-acoustical Transducers: A microphone, Types of microphones their polar frequency response: moving coil, crystal microphone, Ribbon microphone, Single button microphone, condenser microphone, Principle characteristics of microphone, Magnetic microphone, Transformer less microphones, MEMS microphones, Noise- suppressing microphones, Wireless microphones, Useful frequency range for microphones, Comparison of microphones, ,

Unit-II

Loudspeakers and Recording systems: Loudspeaker basics, performance factors, Types of Loudspeakers: Dynamic cone-type moving coil loudspeaker, Horn-type moving coil loudspeaker and Electrostatic type loudspeaker, multi way speaker systems: Cross over networks, Woofers, midrange and Tweeters, Baffles and enclosures, mounting of direct radiator loudspeakers. Earphones and hearing aids.

Unit-III

Recording: Video Cassette recorders, Video Tape characteristics, Tape recording and play back. Basic principal of video recording on Disc, Digital Video Disc (DVD): DVD technology, Disc and data details DVD Audio- DVD Video, Dolby digital sound, blue ray disc

Unit-IV

Display Fundamentals: Television basics, Composite video signal, Modulation requirement, TV standards requirement, NTSC and PAL colour system, Advanced DTH system, cable TV, IP TV in multimedia, digital TV- HD (High definition) display.

Unit-V

Principle of Vision and Application of Visual Properties: Luminance and Colour, response of eye, Colour representation, Video system characteristics, Function of digital Camera, charged coupled device (CCD), Principle and display application of LED, Liquid crystal and plasma devices, 3D display concept, Touch screen basics.

Course Outcomes:

After completion of the course student will be able to:

1. Understand and analyse various microphones and loudspeakers.
2. Know the basic principle of recording and reproduction system like stereo recording and playback.
3. Explain the modern digital systems like DVD, Dolby digital sound, Blue ray disc.
4. Understand the basics of television standards and advanced HD TV and advanced DTH.
5. Acquire knowledge about advanced digital cameras, LED display, 3D display and touch screen.

Text Books:

1. **Ajay**- Dhanpat Rai & Sons Pub Audio Video and T.V Engineering.
2. **Gupta K.G-** Audio and Video Systems, Tata McGraw Hill Publication.

Reference Books:

1. **Kinsler**- Fundamentals of Acoustics, John Wiley & Sons. Inc.
2. **Whitaker Jerry** - Electronic Displays Technology, Design, and Applications, McGraw-Hill International Editions. 1994.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester-V

List of courses in Open Elective Course-III (OEC-III)

Course Title: Data Structures Using C **Max Marks: 100**
Course Code: OEC-CE-584/PCC-CSE-321 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objectives:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

Unit-I

Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea for Hash Function, Separate Chaining, Open Addressing, Linear Probing.

Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

Unit-III

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures. Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.

Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-IV

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

Unit-V

Graphs: Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms:

Dijkstra`s Algorithm and Warshall`s Algorithm, Minimum Spanning Tree, Kruskal`s Algorithm and Prim`s Algorithm.

Course outcomes:

At the end of this course, the student will able to do the following:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books:

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and SatrajSahni**, An Introduction to Data Structures, ComputerScience Press, Rockville MA 1984.

3. **M. A. Weiss**, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia.

Reference Books:

1. **E. Horowitz & S. Shani**Fundamentals of Data Structures in C, Galgotia Pub. 1999.
2. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
3. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

SEMESTER-VI

Course Title: Transportation Engineering **Max. Marks: 100**
Course Code: PCC-CE-621 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Objective: The objective of this course is to provide basic knowledge to the students pertaining to roads, their construction material and bridges.

UNIT I

Highway development and planning-Classification of roads, road development in India, Current road projects in India; highway alignment and project preparation.

UNIT II

Geometric design of highways-: Introduction; highway cross section elements, sight distance, design of horizontal alignment; design of vertical alignment; design of intersections, problems

Department of Civil Engineering

UNIT III

Traffic engineering & control- Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control; design of road intersections; design of parking facilities; highway lighting; problems

UNIT IV

Pavement materials- Materials used in Highway Construction- Soils, Stone Aggregates, bituminous binders, bituminous paving mixes; requirements for different types of pavements and their design.

UNIT V

Design of pavements- Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexible pavements as per IRC; rigid pavements- components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC; problems

Course outcome: The students will be able to:

1. Carry out surveys involved in planning and highway alignment
2. Design the geometric elements of highways and expressways
3. Carry out traffic studies and implement traffic regulation and control measures and intersection design
4. Learn Characterize pavement materials
5. Design flexible and rigid pavements as per IRC

Text Books:

1. Partha Chakraborty, ' Principles Of Transportation Engineering, PHI Learning,
2. Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski,' Principles of Highway Engineering and Traffic Analysis', 4th Edition, John Wiley

Reference Books:

1 Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering',Revised 10th Edition, Nem Chand & Bros, 2017

2 Kadiyalai, L.R., ' Traffic Engineering and Transport Planning', Khanna Publishers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Department of Civil Engineering

SEMESTER-VI

Course Title: Irrigation Engineering **Max. Marks: 100**
Course Code: PCC-CE-622 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The aim of the course is to provide basic knowledge to the students about measurement and occurrence of water and water resource planning.

UNIT-I

Introduction: Irrigation requirements and Advantages; Types of Irrigation; Various methods of Irrigation-Gravity, Lift, Sprinkler and Drip irrigation; Water Requirement of Crops-Crop types, Consumptive use, Measurement of consumptive use, Irrigation requirements, Duty, Delta, Irrigation efficiencies; Irrigation Management.

UNIT-II

Canal Irrigation: Types of canals, parts of canal irrigation systems, channel alignment, assessment of water requirements, water logging and drainage, estimation of channel losses, Design of Channels, Regime and semi-theoretical approaches; canal lining, factors affecting choice of various types of canal lining.

UNIT-III

Diversion Headwork: Diversion head works, types of weirs/Barrages, Parts of diversion head works, Selection of sites and layout, design of weirs on permeable foundations, silt excluders and silt ejectors.

UNIT-IV

Cross Drainage Works: Necessity of cross drainage works, their types and selection; design of various types of cross drainage works such as aqueduct, siphon, super passage, river training.

UNIT-V

Flood Control: Floods, types of flood control measures, drainage of irrigation land both saline and alkaline.

Outcomes: At the end of the course, students will be able to:

1. Understand the irrigation system, types, methods and its advantages
2. Design of channels
3. Understand the different types of diversion headwork.
4. Understand the different types of cross drainage works and able to design them.
5. Understand the concept of floods and its control.

Text Book/Reference Books:

1. Bharat Singh, Fundamentals of Irrigation Engineering.
2. Varshney, Gupta & Gupta, Theory and design of irrigation structures Vol. I & II

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Course Title: Advance Structure Design **Max. Marks: 100**
Course Code: PCC-CE-623 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: This course aims to strengthen the design skills in foundations, R Walls, domes and Pre stressed structures.

UNIT-I Foundations: Various types of RCC footings, Design of isolated and combined footings. Introduction to Raft foundation.

UNIT-II Retaining Walls: Stability analysis of retaining walls, design of cantilever and counter for type RCC retaining walls.

UNIT-III Water Retaining Structures: Design of underground, circular and rectangular water tanks-reference to IS:3370

UNIT-IV Shell Structures: Membrane analysis of spherical and conical domes by statical methods. Design of domes and ring beams.

UNIT-V Pre-Stressed Concrete: General principles, Methods of pre-stressing, pre-tensioning and post-tensioning, losses in pre-stress. Design of rectangular, T and I section beams.

Course Outcomes:

After studying the course student will:

1. Able to design the isolated and combined footing.
2. Able to design the retaining walls and analyse them for stability.
3. Capable of designing the different water tanks.
4. Able to do the membrane analysis of domes and design them.
5. Understand the methods of pre-stressing and able to calculate losses in pre-stress member.

Text Books:

1. Bowels, Foundation Engineering.
2. Jain & Jaikrishen, Design of R.C.C Structures Vol.-II.
3. Krishnarayan, Prestress Concrete Structures.

Books Recommended:

1. Kong & Evans, Design of reinforced and pre stressed concrete Structures.
2. A.K. Jain, Design of R.C.C.-Limit state Method.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Course Title: Transportation Engg. Lab. **Max. Marks: 50**
Course Code: PCC-CE-631 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

(A) Tests on Aggregate:

1. Aggregate grading and determination of specific gravity.
2. Determination of crushing value.
3. To carry out Los Angels abrasion test.
4. To carry out Impact test.
5. Shape tests: Flakiness and elongation index determination.

(B) Tests on Bitumen:

6. Determination of Penetration value.
7. To find out ductility of a bitumen sample.
8. Determination of Flash & Fire-point.

(C) Tests on Subgrade:

9. Determination of sub-grade modulus.
10. Determination of California bearing ratio.

Course Outcomes: The students will be able to find out the different properties of aggregate, bitumen and subgrade soil.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

SEMESTER-VI

Course Title: Survey Camp **Max. Marks: 100**
Course Code: PCC-CE-632 **University Examination: 50**
Duration of Exams: 3 hours **Internal Assessment: 50**
Credits 2(0-0-4)

A. Two Week Duration

1. Triangulation:
    i. Ordinary Methods
    ii. On the basis of Global positioning system (GPS)
    iii. Shifting of Horizontal and Vertical Controls
2. Setting out of works
4. Setting out of Curves
5. Contouring:
    i. Contouring of a Dam Reservoir/Railway line
    ii. Preparing a contour plan by various methods
    iii. Setting out of Contour lines of an appropriate site.

Course Outcomes: The students will know how to set out curves and prepare a contour map. Further, in Survey camp, students obtain extensive hands-on experience in the use of land surveying instruments and in the essentials of survey practice. Measurements of distances and angles, calculation and correction of errors are introduced.

Note:-These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Professional Elective Course- I (PEC-I)
SEMESTER-VI

Course Title: Construction Engg. & Management **Max. Marks: 100**
Course Code: PEC-CE-661 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The objective of this course is to acquaint the students about equipment employed to construct civil engineering structures and the methodology to execute various construction works.

UNIT-I

Basics of Construction-Unique features of construction, construction projects types and features, phases of a project, agencies involved and their methods of execution. pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail.

UNIT-II

Construction project planning- Stages of project planning: Techniques of planning- Bar charts, Gantt Charts Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks. PERT- Assumptions underlying PERT analysis, determining three-time estimates, analysis, slack computations, calculation of probability of completion.

UNIT-III

Construction Equipment basics*:* Conventional construction methods Vs Mechanized methods and advantages of latter; Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials. Equipment Productivities.

UNIT-IV

Planning and organizing construction site and resources- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation; Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing; Funds: cash flow, sources of funds; Histograms and SCurves. Earned Value; Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts; resource aggregation, allocation, smoothening and levelling. Common Good Practices in Construction.

UNIT-V

Contracts Management basics*:* Importance of contracts; Types of Contracts, parties to a contract; Common contract clauses (Notice to proceed, rights and duties of various parties, notices to be given, Contract Duration and Price. Performance parameters; Delays, penalties and liquidated damages; Force Majeure, Suspension and Termination. Changes & variations, Dispute Resolution methods. Construction Costs*:* Make-up of construction costs*;* Classification of costs, time cost trade-off in construction projects, compression and decompression.

Course Outcomes: After successfully studying this course, students will have:

1. An understanding of modern construction practices
2. A good idea of basic construction dynamics- various stakeholders, project objectives, processes, resource required and project economics.
3. A basic ability to plan, control and monitor construction projects with respect to time and cost and an idea of how to optimise construction projects based on costs
4. An idea how construction projects are administered with respect to contract structuresand issues.

Text Books:

1. Punmia B.C, PERT & CPM.
2. Purifoy R. L, Construction Methods, Plant & Equipment.
3. Arora S.P, Bindra S.P, Building Construction, DhanpatRai publication.

Reference Books:

1. Varghese, P.C., "*Building Construction"*, Prentice Hall India.
2. Chudley, R., *Construction Technology*, ELBS Publishers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-I (PEC-I)

Course Title: Pavement Material and Geometric Design of Highway **Max. Marks: 100**
Course Code: PEC-CE-662 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The objective of this course is to provide knowledge to the students pertaining to pavement material and geometric design of highway

UNIT I

Pavement Materials. Soil - Classification, characteristics, compaction, evaluation of soil strength; stabilized pavement materials; Aggregates: requirements, properties and tests on road aggregates for flexible and rigid pavements.

UNIT II

Bitumen: Origin, preparation, properties and tests, constitution of bituminous road binders; requirements; Criterion for selection of different binders. Bituminous Emulsions and Cutbacks: Preparation, characteristics, Bituminous Mixes: Mechanical properties: Resilient modulus, dynamic modulus and fatigue characteristics of bituminous mixes. Bituminous mix design methods and specifications. Weathering and Durability of Bituminous Materials and Mixes. Performance based Bitumen Specifications; Superpave mix design method: design example problems. Cement Concrete for Pavement Construction: Requirements, and design of mix for CC pavement, IRC and IS specifications and tests, joint filler and sealer materials.

UNIT III

Geometric Design of Highways: Classification of rural highways and urban roads, Topography, vehicle characteristics and design vehicle, driver characteristics, speed, traffic flow and capacity, levels of service, pedestrian and other facilities, environmental factors, Objectives and requirements of highway geometric design, geometric design of highway and Design Controls.

UNIT IV

Design Elements: Sight distances, Horizontal alignment - design considerations, stability at curves, super elevation, widening, transition curves; curvature at intersections, vertical alignment - grades, ramps, design of summit and valley curves, combination of vertical and horizontal alignment including design of hair pin bends, design of expressways, IRC standards and guidelines for design problems; Cross Section Elements: Right of way and width considerations, roadway, shoulders, kerbs traffic barriers, medians, frontage roads, Facilities for pedestrians, bicycles, buses and trucks, Pavement surface characteristics - types, cross slope, skid resistance, unevenness;

UNIT V

Design Considerations and Design: Design considerations for rural and urban arterials, freeways, and other rural and urban roads; Design Of Intersections: Characteristics and design considerations of atgrade intersections, Rotary intersections; Grade separations and interchanges -Design of Parking lots.

Course Outcomes: The students will be able to understand:

1. The different type of pavement materials.
2. Different properties of bitumen and cement concrete pavement.
3. The geometric design of highways
4. The different design elements of highways.
5. The design consideration of roads and design of intersection.

Reference books:

1. **Victor,** DJ Essentials of Bridge Engineering, H Oxford and IBH Publishers, New Delhi
2. **Bindra,** S.P Principles and Practice of Bridge Engineering", DhanpatRai and Sons, New Delhi. 3. **Bhanot, K. L** "Highway Engineering", S. Chand and Company Pvt. Ltd. New Delhi 4. **Khanna, S & Justo,** Highway Engineering,Nem Chand Brothers Roorke.
5. **Ponnuswamy S. & H. Toto,** Bridge engineering, McGraw Hill, New Delhi.
6. **R.J Salter & N.B Hounsel,** Highway Traffic Analysis and
7. Design,Macmillan Press ltd.1996

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-I (PEC-I)

Course Title: Advance Soil Mechanics **Max. Marks: 100**
Course Code: PEC-CE-663 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective:
To impart advanced knowledge and skill for soil identification, classification other physical properties of soils, viz. seepage, stress distribution, shear strength and cofferdam.

UNIT I
Soil Structures & Mineralogy: Soil texture, Solid particles in soil, Atomic & molecular bond, Interparticle forces in a soil mass, Single grained structure, Honey -comb structures. Flocculent &dispersed structures, Structure of connected soil, Clay minerals.

UNIT II
Soil Waterand stress: Modes of occurrence of water in soils- Absorbed water, Double layer, Capillary water. Stress condition in soil - Effective & neutral pressures.

UNIT III
Drainage in soil Capillary permeability test. Drainage & Dewatering Ditches & sumps, Well point system, Shallow well system, Deep well drainage, Electrosmosis method, Protective filters.

UNIT IV
Shear Strength Use of Stress path in triaxial test- Undrained & drained tests for Normally Consolidated & Over Consolidated clay samples. Skempton‘s pore-pressure parameters, Choice of shear parameters. Stability of open cut - braced open cut. Bishop‘s rigorous method, Limit equilibrium approach.

UNIT V
Bulk Head & Cofferdams: Classification - cantilever sheet pile wall in cohesion less and in cohesive soils Arching in soils, Classes of underground conduits, loads on positive projecting and negative projecting conduits.

Course Outcomes: The students will be able to understand:
1. The different type of soil structure.
2. Occurrence of water in soil and stress condition.
3. The phenomenon of drainage in soils.
4. The methods to determine the shear strength of soil.
5. The sheet pile walls and different type of conduits, cofferdams.

Text Books:

1. Geotechnical Engineering - S. K. Gulatiet. al., TMH Publishing Co. Ltd, New Delhi.
2. Basic and Applied Soil Mechanics - GopalRanjan and A. S. R. Rao, Wiley Eastern Ltd, New Delhi.
3. Lambe T. W. and Whitman, R.V. (1979), Soil Mechanics, John Wiley & Sons Inc.

Reference Books:

1. Soil Mechanics in Engineering Practice - Terzaghi and Peck, John Wiley and Sons Inc., New York.
2. Soil Mechanics- Lamb and Whitman, Wiley Eastern Pvt. Ltd, New Delhi.
3. Fundamentals of Soil Mechanics - Taylor, John Wiley and Sons Inc New York.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-I (PEC-I)

Course Title: Design of Hydraulic structure **Max. Marks: 100**
Course Code: PEC-CE-664 **University Examination: 60**
Duration of Exams: 3 hours **internal Assessment: 40**
Credits 3(2-1-0)

Course objectives: To impart knowledge regarding the design of the various minor irrigation structures and To convey the knowledge on the causes of failure, design criteria and stability analysis of different types of dams.

UNIT I

Diversion head works - layout and functions of components. Causes of failure of weirs on permeable soils, Bligh's theory and Khosla's theory. Irrigation canals

UNIT II

Design of unlined canals through alluvial soils-Kennedy's theory and Lacey's theory. Minor irrigation structures- Cross drainage works, Canal Regulation works: Falls and Regulators

UNIT III

Design of Hydraulic Structures: Aqueduct, siphon aqueduct, Canal falls-notch type, well type, Sarda type, and Cross regulator.

UNIT IV

Gravity dam - forces acting - stability analysis and modes of failure - theoretical and practical profiles- Functions of shafts, galleries, keys and water stops. Arch dams-types,

UNIT V

Design of canal falls, transitions and cross drainage works; Design principles for gravity and earthen dams Earth dams-types, causes of failure and design criteria. Spillways-Types. Ogee type spillwayprofile.

Course Outcomes: The students will be able to

1. Design minor irrigation structures such as regulators, cross drainage works and canal falls
2. Design the unlined canals.
3. Design the different hydraulic structures.
4. Perform the stability analysis of gravity dams
5. Explain the causes of failure of different types of dams and their design criteria

Text Books :

1. Garg S.K, Irrigation Engineering and Hydraulic Structures, Khanna Publishers, 2006.
2. Modi. P. N., Irrigation Water Resources and Water Power Engineering, Standard Book House, 2009.

3. Punmia B.C. Ashok K Jain, Arun K Jain, B. B. L Pande, Irrigation and Water Power Engineering, Laxmi Publications (P) Ltd. 2010.

References Books:

1. Arora, K.R., "Irrigation, Water Power and Water Resources Engineering", Standard Publishers Distributors, 2010.
2. Asawa. G.L. Irrigation and Water Resources Engineering, New Age International,
3. Sahasrabudhe S.R., Irrigation Engineering & Hydraulic Structures, S.K. Kataria& Sons, 2013
4. Sathyanarayana M. C. Water Resources Engineering-Principles and Practice, New Age International Publishers. 2009

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-I (PEC-I)

Course Title: Rural Water Supply **Max. Marks: 100**

Course Code: PEC-CE- 665 **University Examination: 60**

Duration of Exams: 3 Hours **Internal Assessment: 40**

Credit 3(2-1-0)

Objective: The objective of this course is to provide the students' knowledge about rural water supply and the different types of on-site sanitation system

UNIT I

Sources & Standards: Sources of water, features of water supply systems, Selection of water source, drinking water quality standards, Water borne diseases.

UNIT II

Treatment systems: Stages of water treatment process (brief description only); Bio-sand filters; Removal of arsenic, fluoride, iron and manganese.

UNIT III

Distribution & Disinfection systems: Requirements of a distribution system, Distribution networks – Dead end system, Grid iron System, Ring System and radial System; Disinfection systems for rural areas-Chlorination; Point of use water treatment system. Solar disinfection system.

UNIT IV

Sanitation: Sanitation-definition, relationship between water quality and sanitation. WASH (Water Sanitation & Health) Programme; On-site Sanitation-requirements, advantages, disadvantages and Technologies of on-site sanitation. Meaning of offsite sanitation.

UNIT V

Treatment Units: Design of septic tanks, single-pit and double-pit toilets. Small bore systems, bio digesters, reed beds, constructed wetlands, sludge management systems.

Course Outcomes: At the end of this course, students will able to:

1. Understand the different attributes of water supply system.
2. Understand the different treatment system
3. Have knowledge about different disinfection systems.
4. Design the different treatment units and know the different on-site sanitation systems
5. Knowledge about the treatment units and design of septic tank.

Text Books:

1. Environmental Engineering by Peavy H.S, Rowe D.R. and Tchobanoglous G, Tata McGraw Hills, New Delhi.
2. Environmental Engineering (Vol I), Water Supply Engineering, S.K. Garg, Khanna Publishers, New Delhi.
3. G.M. Fair, J.C. Geyer, D.A. Okan, Elements of Water Supply and Wastewater Disposal, John Wiley and Sons Inc.

Reference Books

1. Terence, J. McGhee Water Supply and Sewerage, McGraw Hill Book Co.
2. M.J. Hammer, Water and Waste Water Technology, John Wiley and Sons, New York.
3. CPHEEO: Manual on water supply and treatment, Ministry of Urban Development.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-I (PEC-I)

Course Title: Remote Sensing & GIS **Max. Marks: 100**

Course Code: PEC-CE-666 **University Examination: 60**

Duration of Exams: 3 hours **Sessional Assessment: 40**

Credits 3(2-1-0)

Objectives:

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on-site observation, especially the Earth.

UNIT-I

Introduction

Introduction to Remote Sensing, Data acquisition and processing, Applications, Electromagnetic Radiation (EMR) and its characteristics, Planck's Law, Stefan's Law, Wein's Displacement law, Properties of solar radiant energy, Atmospheric windows.

UNIT-II

Physical basis of remote sensing

Interaction in the atmosphere, nature of atmospheric interaction, atmospheric effects of visible, near infrared thermal and microwave wavelengths, interaction at ground surface, interaction with soils and rocks, effects of soil moisture, organic matter, particles, size and texture, interaction with vegetation, spectral characteristics of individual leaf, vegetation canopies, effect of leaf pigments, cell structure, radiation geometry.

UNIT-III

Platform and sensors

Multi concept in remote sensing, general requirements of a platform, balloon aircraft, satellite platforms sun-synchronous orbits, sensors for visible and near infrared wavelengths, profilers, images, scanners, radiometers, optical mechanical and push button scanners, spectral, spatial, radiometric and temporal resolution, IFOV, FOV, geometric characteristics of scanners, V/H ratio, comparison of some satellite/ aerial platforms and sensors and remote sensing data products, land sat MSS and TM, SPOT, IRS, ERS etc.

UNIT-IV

Geographical Concepts and Terminology

Difference between image processing system and geographical system (GIS), utility of GIS, various GIS packages and their salient features, essential components of a GIS, scanners and digitizers.

UNIT-V

Data Base

Raster and vector data, data storage, hierarchical data, network systems, relational database, data management, conventional database management systems, spatial database management, data manipulation and analysis, reclassification and aggregation, geometric and spatial operation on data management and statistical modeling, applications of GIS in various natural resources and engineering applications.

Course outcome: After successfully studying this course student will:

1. Able to understand Remote Sensing and data acquisition and processing, sensor Systems and its applications.
2. Know the nature of atmospheric interaction, atmospheric effects of visibility and, interaction with soils and rocks etc.
3. Understand multi concept in remote sensing and balloon aircraft and comparison of some satellite/ aerial platforms and sensors and remote sensing data products.
4. Understand difference between image processing system and geographical system (GIS), utility of GIS and essential components of a GIS.
5. Know the raster and vector data, data storage, hierarchical data, network systems, relational database, data management, conventional database management systems and applications of GIS in various natural resources and engineering applications.

Text Books

1. Remote Sensing and Image Interpretation: T.M. Lillensand and R.W. Keifer
2. Principles of Remote Sensing : P.J. Curren
3. Principles of Geographical Information systems for land Resources Assessment : P.A. Baurrough

Reference Books

4. Manual of Remote Sensing, Vol.2 : American Society of Photogrammetry and Remote Sensing
5. Geographical Information systems- A Management Perspective : Stan Aromoff

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each

SEMESTER VI

Professional Elective Course-II (PEC-II)

Course Title: Engineering Geology **Max. Marks: 100**
Course Code: PEC-CE-667 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The aim of this course is to make the students aware about the earth, its constitution, rocks and soil, impact of wind and precipitation. Earthquakes have also been incorporated to be studied.

Unit –I

Introduction- rocks and minerals: Definition and Scope of Engineering Geology with its importance in Civil Engineering. introduction of Rocks, classification of rocks, Application of rocks as an engineering materials, building stone, Physical and chemical properties of Rocks, mode of formation of rocks, agents of metamorphism and zone of metamorphism.

Unit- II

Weathering and faults: Weathering; mechanical and chemical weathering. Erosion; Erosion by running water and wind, fold- various types of folds, faults-various types of faults, joint-various types of joints, civil engineering significance of folds, faults and joints.

Unit –III

Water conservation practices and seismicity: groundwater, ground water recharge, rainwater harvesting system, concepts of zone of aeration and saturation, Seismicity, seismic zones in India and their significance.

Unit IV

Mineralogy and Geological investigations: Rock forming minerals, Properties of minerals, Mineral Composition affecting the properties of Concrete at its fresh stage, geological investigation techniques. Geological investigations of Dam site, reservoir, bridges, highways, buildings and tunnels.

Unit- V

Soft computing tools: An introduction to software's for the solution of engineering geologic problems such as Dip, Strike, Abacus etc., Advantages/Disadvantages and applications of this software. Software for interpretation of sub-surface geological strata and its application.

Course Outcomes: After completing subject, Students will be able to

1. Understand the role of geology in the design and construction process of underground openings in rock.
2. Understand about types of weathering ,fault, fold, joints in rock.
3. Understand about ground water recharge, rain water harvesting and also about the seismic zones in India.

4. Use the geologic literature to establish the geotechnical framework needed to properly design and construct heavy civil works rock projects.
5. Introduction about soft computing tools used in geological investigation.

Text Books

1. Parbin Singh, Engineering Geology.
2. Arthur Holmes, Physical Geology.

Reference Books:

1. Shilling P.B,Structural Geology.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VI

List of courses in Professional Elective Course-II (PEC-II)

Course Title: Professional practice law and ethics **Max. Marks: 100**
Course Code: PEC-CE-668 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.

UNIT I

Professional Practice and Professional Ethics – Respective roles of various stakeholders: Government; Standardization Bodies (ex. BIS, IRC); professional bodies (ex. Institution of Engineers (India), Indian Roads Congress; Clients/ owners (role governed by contracts); Developers (role governed by regulations such as RERA); Consultants (role governed by bodies such as CEAI); Contractors (role governed by contracts and regulatory Acts and Standards). Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistle blowing, protected disclosures.

UNIT II

General Principles of Contracts Management*:* Indian Contract Act, 1972 and Amendments covering General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub-contracts; Joint Ventures & Consortium; Complex contract terminology; Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Contract Conditions &Specifications; Critical /"Red Flag" conditions; Contract award & Notice To Proceed; Variations & Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions & Terminations; Time extensions & Force Majeure; Delay Analysis; Liquidated damages & Penalties; Insurance & Taxation; Performance and Excusable Non-performance; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build-Own-Operate & variations; Public-Private Partnerships; International Commercial Terms.

UNIT III

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system*:* Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement,

Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalats.

UNIT IV

Engagement of Labour and Labour & other construction-related Laws*:* Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piecerate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017.

UNIT V

Law relating to Intellectual property*:* Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Patent protection for computer programs, Process of obtaining patent – application, examination, opposition and sealing of patents, Patent cooperation treaty and grounds for opposition, Rights and obligations of patentee, Duration of patents – law and policy considerations, Infringement and related remedies.

Course Outcomes:

1. To familiarise the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession
2. To give a good insight into contracts and contracts management in civil engineering dispute resolution mechanisms; laws governing engagement of labour
3. To give an understanding of Intellectual Property Rights, Patents.
4. To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
5. To develop good ideas of the legal and practical aspects of their profession.

Text Books:

1. B.S. Patil, Legal Aspects of Building and Engineering Contracts
2. The National Building Code, BIS, 2017

Reference Books:

3. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House
4. Vee, Charles &Skitmore, Martin (2003) Professional Ethics in the Construction
5. Industry, Engineering Construction and Architectural management
6. Engineering ethics: concepts and cases – C. E. Harris, M.S. Pritchard, M.J.Rabins

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VI

Professional Elective Course-II (PEC-II)

Course Title: Construction practice and planning **Max. Marks: 100**
Course Code: PEC-CE-669 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(3-0-0)

Objective: The objective of this course is to acquaint the students about equipments employed to construct civil engineering structures and the methodology to execute various construction works.

UNIT I

Construction Methods basics: Types of foundations and construction methods;

Basics of Formwork and Staging; Common building construction methods (conventional walls and slabs; conventional framed structure with blockwork walls; Modular construction methods for repetitive works; Precast concrete construction methods; Basics of Slip forming for tall structures; Basic construction methods for steel structures; Basics of construction methods for Bridges.

UNIT II

Building Construction Practice. Specifications, details and sequence of activities and construction coordination – Site Clearance – Marking – Earthwork - masonry – stonemasonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements –Building foundations – basements – temporary shed – centering and shuttering – slip forms –scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames –braced domes – laying brick — weather and water proof – roof finishes – acoustic and fire protection.

UNIT III

Construction Project Planning& Systems. Definition of Projects; Stages of project planning: pretender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts.

UNIT IV

Project Monitoring & Control- Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of

time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management; Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

UNIT V

Construction Cost Analysis. Introduction to the application of scientific principles to costs and estimates of costs in construction engineering; concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost markups and profits; fundamentals of cost recording for construction cost accounts and cost controls.

Course Outcomes: After successfully studying this course, students will have:

1. An understanding of modern construction practices.
2. A basic ability to plan, control and monitor construction projects with respect to time and cost and an idea of how to optimise construction projects based on costs
3. An idea how construction projects are administered with respect to contract structures and issues.
4. The idea about the project monitoring ,supervison and controlling.
5. Knowledge of methods of cost analysis in different construction projects.

Text Books:.

1. **Purifoy R. L,** Construction Methods, Plant & Equipment.
2. **Arora S.P, Bindra S.P**, Building Construction, DhanpatRai publication.

Reference Books:

3. Varghese, P.C., "*Building Construction"*, Prentice Hall India.
4. Chudley, R., *Construction Technology*, ELBS Publishers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VI

Professional Elective Course-II (PEC-II)

Course Title: Industrial Waste Treatment **Max. Marks: 100**
Course Code: PEC-CE-670 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: To impart knowledge for the various techniques employed for characterisation and quantification of waste/wastewater generated by various industrial activities, and safe disposal of treated waste/wastewater employing appropriate treatment methods in to the environment.

UNIT I

Industrial wastewaters, nature and effects, water pollution and problem pollutants Stream sanitation, de-oxygenation and self-purification in streams.

UNIT II

Sources and characteristics of industrial wastewaters, sampling and analysis In-plant waste control and water reuse.

UNIT III

Different methods of treatment, Screening, sedimentation, Coagulation and Flocculation, floatation, aeration, aerobic and anaerobic digestion.

UNIT VI

Ion exchange, reverse osmosis, adsorption, combined biological, physical and chemical process.

UNIT V

Application of treatment methods to some selected industries. Introduction to ISO: 14,000, Life cycle analysis etc.

Outcome: The students would be able to

1. characterize and quantify of wastewater generated from the various industry,
2. Knowledge of sources and characterstic of industrial waste waters
3. Knowledge of different methods of treatments of waste water
4. Knowledge of different methods of treatments of waste water
5. design the various process for the treatment of the Industrial wastewater.

Text Books:

1. Waste Water Engineering: Treatment and Reuse, Metcalf & Eddy, T.M.H. Publication. Environmental Engineering by Peavy H.S, Rowe D.R. and Tchobanoglous G, Tata McGraw Hills, New Delhi.

Reference Books:

1. G.M. Fair, J.C. Geyer, D.A. Okan, Elements of Water Supply and Wastewater Disposal, John Wiley and Sons Inc.
2. Terence, J. McGhee Water Supply and Sewerage, McGraw Hill Book Co.
3. M.J. Hammer, Water and Waste Water Technology, John Wiley and Sons, New York.
4. CPHEEO: Manual on Sewerage and Sewage Treatment, Ministry of Works and Housing, New Delhi.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VI

Professional Elective Course-II (PEC-II)

Course Title: Highway Construction and Pavement Design **Max. Marks: 100**
Course Code: PEC-CE-671 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: To introduce the elements related to highway engineering. The subject knowledge of traffic engineering, geometric design and pavement design shall be imparted along with highway material and construction.

UNIT I

Introduction: Types and component parts of pavements, Factors affecting design and performance of pavements. Highway and airport pavements. Stresses and Deflections in Flexible Pavements: Stresses and deflections in homogeneous masses. Burmister's two-layer theory, three layer and multi-layer theories; wheel load stresses, various factors in traffic wheel loads; ESWL of multiple wheels. Repeated loads and EWL factors; sustained loads. Pavement behaviour under transient traffic loads.

UNIT II

Flexible Pavement Design: Methods For Highways and Airports: Empirical, semi-empirical and theoretical approaches development, principle, design steps, advantages; design of flexible pavements as per IRC;Stresses in Rigid Pavements: Types of stresses and causes, factors influencing the stresses general considerations in rigid pavement analysis, EWL; wheel load stresses, warping stresses, frictional stresses, combined stresses.

UNIT III

Rigid Pavement Design: Types of joints in cement concrete pavements and their functions, joint spacings; design of CC pavement for roads and runways as per IRC, design of joint details for longitudinal joints, contraction joint sand expansion joints. IRC method of design by stress ratio method. Design of continuously reinforced concrete pavements; Maintenance, repair and rehabilitation of pavements including design of bituminous and concrete overlays as per IRC

UNIT IV

Highway Construction: Flexible Pavement Construction: Earthwork, compaction and construction of embankments, specifications of materials, construction methods and field control checks for various types of flexible pavement materials in subbase, base, binder and surface course layers and their choice;

UNIT V

Cement Concrete Pavement Layers: Specifications and method of cement concrete pavement construction; Construction of interlocking block pavements, Quality control tests; Construction of various types of joint, Soil Stabilized Pavement Layers Principles of gradation/proportioning of soil aggregate

mixes and compaction; Design factors, mix design, construction control and quality control checks for mechanical, soil-cement, soil-bitumen and soil-lime stabilization methods. Use of additives, Numerical problems on mix design and applications;

Outcome: The students will have

1. Understanding of stresses and deflection in flexible and rigid pavement.
2. The ability to design the flexible pavements.
3. The ability to design the rigid pavements.
4. Understanding of the construction of highway.
5. Knowledge of the different layers of a rigid concrete pavement.

Text Books:

1. Khanna, S. K. and Justo, C. E. G., Highway Engineering, Nemchand Bros., Roorkee
2. Kadiyali, L. R., Principle and Design of pavements, Khanna Publishers, New Delhi
3. Kumar SrinivasaR.,Textbook of Highway Engineering, University Press

Reference Books:

1. Wright, P. H., Highway Engineering, John Wiley and Sons, New York.
2. Hay, W. W., Introduction to Transportation Engineering. John Wiley and Sons, New York.
3. Papacostas, C. S., Fundamentals of Transportation Engineering, Prentice Hall of India, New Delhi.
4. Huang, Y. H., Pavement analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

Professional Elective Course-II (PEC-II)

Course Title: Tunnel Engineering **Max. Marks: 100**

Course Code: PEC-CE-672 **University Examination: 60**

Duration of Exams: 3 hours **Internal Assessment: 40**

Credits 3(2-1-0)

Objectives: To introduce the basic concept of tunneling & ground improvement techniques and Students will be able to understand the fundamentals design of tunnels. Students will be able to recognize the different types of tunnelling methods, operations and equipment**.**

UNIT I

Introduction: Terminology & general aspects, historical developments of tunnelling, classification of tunneling methods, merits and demerits, conditions favorable for tunnel construction - parameters influencing location, shape and size; surface and subsurface conditions; planning and site investigations like geology, hydrogeology, geological disturbances etc.,

UNIT II

Geomechanics: Classification and characterization of rock mass and soil, in-situ determination of engineering properties of rock mass, geotechnical exploration for soil profile, effect of geological structures on tunnel excavation, stress analysis using numerical methods; instrumentation and measurements in tunneling.

UNIT III

Conventional Tunnelling Methods: Factors affecting choice of excavation technique; various tunneling methods - soft ground and hard rock, shallow tunneling, deep tunneling; Scaling factor using their properties in tunnel design; Operation cycles in conventional tunneling; selection of drilling equipment, drilling tools, drill ability factors; types of drilling patterns and vertical drilling; selection of blasting techniques - explosives, initiators, blast design, tunnel blast performance - powder factor, equipment selection for mucking and transportation.

UNIT IV

Modern Tunneling Methods: Tunnelling by road headers and impact hammers - cutting principles, method of excavation, selection, limitations and technical problems, tunnel boring machines - boring principles, method of excavation, selection, performance, limitations and technical challenges, scope of application, special methods - New Austrian tunneling; Immersed tunneling, micro tunneling, tunnel jacking, technical considerations and limitations.

UNIT V

Supports, Ventilation and Safety: Ground squeeze, rock burst, types of supports, design and selection of support - lining, rock bolt, grouting, ground treatment in tunneling, tunnel ventilation systems during and

after completion - methods of ventilation, air conditioning, tunneling utilities - lighting and drainage of tunnels, risk management of tunneling; Safety aspects in road, rail tunnels and metro tunnels.

Outcomes The students will able to

1. Design the tunnel for the given geo-technical conditions
2. Choose the type of the equipment and operations**.**
3. Understand the conventional tunneling methods
4. Understand the modern tunneling methods.
5. Have a sound knowledge of safety norms adopted while tunneling.

Text Books:

1. Bernhard M. Markus T. Ulrich M., "Handbook of Tunnel Engineering I & II: Basics And Additional Services For Design And Construction", John Wile Publications, 2014.
2. Brady B H G, Brown E T, "Rock Mechanics: for Underground Mining", Springer's Publishers, 3rd Edition, 2004.
3. Champan D, "Introduction to Tunnel Construction", CRC Press, 1st Editions, 2010.

Reference Books:

4. Kuesel, T. R., King, E. H., Bickel, J. O. , "Tunnel Engineering Handbook", Springer US, 2nd edition, 2011.
5. Ramamurthy T N, "Engineering in Rocks for Slopes Foundations and Tunnels", PHI Learning Pvt Ltd, 2nd Edition, 2010.
6. Subhash C Saxena, "Tunnel Engineering", DhanpatRai&Sons , New Delhi, 1998.
7. Srinivasan R, Bhaskar R C,"Harbour, Dock and Tunnel Engineering", Charotar Publishers, 2003.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Data Base Management System **Max. Marks: 100**
Course Code: OEC-CE-681/PCC-IT-421 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(3-0-0) Objectives:

Course Objective: The main objective of this course is to introduce the basic concepts of database, data modeling techniques using entity relationship diagram, relational algebra and calculus, basic and advanced features SQL, normalization, transaction processing, concurrency control, and recovery techniques.

UNIT-I

INTRODUCTION: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, Structure of DBMS.

Data Modelling Using Entity Relationship Model: ER Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Extended ER model concepts.

RELATIONAL MODEL: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity,

UNIT-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple Calculus - Domain calculus.

INTRODUCTION TO SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Sub queries, Aggregate and Scalar Functions, Triggers.

UNIT-III

Normalization – Functional Dependencies, Armstrong's axioms for FD's, Normal Forms: First, Second, Third Normal forms, BCNF, Properties of Decompositions, Multivalued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal form, Inclusion Dependencies.

UNIT-IV

Transaction & Concurrency Control: Transaction Concept, Transaction State, ACID properties. Schedules, Serializability, Testing of Serializability, Recoverability. Recovery from Transaction Failures, Log Based Recovery, Checkpointing, Shadow Paging.

Concurrency Control: Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

UNIT-V

Implementation Techniques- Data Storage and Indexes - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

COURSE OUTCOMES:

1. For a given query write relational algebra expressions for that query and optimize thedeveloped expressions
2. For a given specification of the requirement design the databases using E R methodand normalization.
3. For a given specification construct the SQL queries for Open source and CommercialDBMS -MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity,consistency, isolation, and durability.

TEXT BOOKS:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education

REFERENCE BOOKS:

1. **J. D. Ullman** "Principles of Database and Knowledge – Base Systems", Vol 1 by, Computer Science Press.
2. **R. Elmasri and S. Navathe,** "Fundamentals of Database Systems", 5th Edition by Pearson Education

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Computer Network **Max. Marks: 100**
Course Code: OEC-CE-682/PCC-IT-425 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment:40**
Credits 3(3-0-0)

OBJECTIVES:

1. To provide insight about fundamental concepts and reference models (OSI and TCP/IP) and Its functionalists.
2. To gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP.
3. To know the implementation of various protocols

UNIT- I

Introduction: Basic communication model, Introduction to data communication, components of data communication system, data flow (simplex, half –duplex and full duplex), data transmission (parallel transmission, serial transmission), introduction to computer network, components of computer network, advantages and disadvantages of computer networks, network criteria, network topology, OSI and TCP-IP.

PHYSICAL LAYER: Functions of Physical Layer. Classification of transmission medium.

UNIT-II

Data Link Layer and Medium Access Sub Layer: Functions of Data link Layer, Error Detection and Error Correction (type of errors, Redundancy, coding) parity checking, CRC, Flow Control and Error control protocols, Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window Piggybacking, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA.

UNIT-III

Network Layer: Functions of Network Layer, Packet Switching and Datagram approach, IP addressing methods, IPV4, IPV6, transition from IPv4 to IPv6 (Dual stack and tunneling) Sub netting, Delivery (direct, indirect), Forwarding (forwarding techniques) Routing protocols (RIP, OSPF, BGP), unicast, multicast and broadcast routing Bellman ford and Dijkstra algorithm, ARP, RARP, BOOTP and DHCP.

UNIT-IV

Transport Layer: Functions of Transport Layer, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion control, Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT-V

Application Layer: Domain Name Space (DNS), TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, Bluetooth, Firewalls, Basic concepts of Cryptography.

Course outcomes:

1. Explain the functions of the different layer of the OSI Protocol.
2. Able to understand the two main functions of Data link layer i.e data link control and media access control
3. Able to understand the delivery, forwarding and routing of packets.
4. Understand the difference between process to process, host to host and node to node communication.
5. Able to understand what services are provided by the application layer to the user.

TEXT BOOKS:

1. Behrouz A. Forouzan, Data Communication and Networking, 4th Edition, McGraw Hill.
2. William Stallings, Data and Computer Communication, 8th Edition, Pearson Prentice Hall India.

REFERENCE BOOK:

1. Andrew S. Tanenbaum, Computer Networks, 8th Edition, Pearson New International Edition.
2. Douglas Comer, Internet working with TCP/IP, Volume 1, 6th Edition Prentice Hall of India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will
be set from each unit. The student has to attempt 5 questions selecting at least one question
from each unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Electrical Measurement-I **Max. Marks: 100**
Course Code: OEC-CE-683/PCC-EE-423 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment:40**
Credits 3(3-0-0)

Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Unit-I: Measurement System & Characteristics of Instruments

Introduction, significance of measurements, methods of measurements, Instruments & measurement system, Classification of instruments – mechanical, electrical & electronic instruments, deflection & null type instruments, Comparison of Analog & digital modes of operation. Application of measurement systems, errors in measurements, types of errors. Accuracy, Precision, Resolution, loading effects. Units Absolute, Fundamental & derived.

Unit-II: Bridge Circuits

Wheatstone Bridge- galvanometer sensitivity, current through galvanometer & limitations, Kelvin Double Bridge, Maxwell Inductance Bridge, Maxwell inductance – capacitance bridge, Anderson's bridge, Schering Bridge, Hay Bridge & Wien's Bridge. Measurement of effective resistance, inductance & capacitance at high frequency Meter.

Unit-III: Eectro-mechanical Indicating Instruments

D Arsonval Galvanometer- construction & theory, Torque equation, Dynamic behavior & Galvanometer constants. Ballistic galvanometer- construction & theory. Introduction to PMMC Instruments and Moving Iron Instruments.

Unit-IV: Ammeters, Voltmeters

DC Ammeter, Multi-range Ammeter, RF Ammeter. DC Voltmeter, Multi-range Voltmeter, Extending ammeter & Voltmeter Ranges- Multipliers & shunts, The Aryton Shunt or Universal Shunt, Requirements of a Shunt, Introduction to Instrument Transformers & their application to extension of Instrument range.

Unit-V: Measurement of Energy & Power

Measurement of power in three phase AC circuits using single phase & three phase wattmeter, Measurement of reactive power (single phase & three phase), Measurement of energy using Induction type meter, Energy meter testing, Power factor meter.

Course Outcomes.

The student will learn:

1. Introduction to Measurement System & Characteristics of Instruments.
2. Exposure to the Bridge Circuits and to learn various measurements techniques used for the measurement of capacitance and inductance.
3. Exposure to Electromechanical Indicating Instruments.
4. Exposure to various types of Ammeters and Voltmeters.
5. Exposure to different methods used in the measurements of Energy & Power.

Text Books/References:

1. **Albert D.Helfrick and William D. Cooper**, "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2007.
2. **Ernest o Doebelin and dhanesh N manik**, "Measurement systems" ,5th edition ,McGraw-Hill, 2007.
3. **John P. Bentley**, "Principles of Measurement Systems", Fourth edition, Pearson Education Limited, 2005.
4. **A. K. Sawhney**, "Course In Electrical And Electronic Measurement And Instrumentation", DhanpatRai Publisher, 2000.
5. **Bouwens,A.J**, "Digital Instrumentation", Tata Mc-Graw Hill, 1986.
6. **David A.Bell**, "Electronic Instrumentation and Measurements", Second edition, Prentice Hall of India, 2007.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit.The student has to attempt five questions selecting one from each unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Computer Graphics and Multimedia **Max Marks: 100**

Course Code: OEC-CE-684/PCC-CSE-622 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits 3(3-0-0)

OBJECTIVE: To understand the basics of various inputs and output computer graphics hardware devices. Exploration of fundamental concepts in 2D and 3D computer graphics. To know 2D raster graphics techniques, 3D modelling, geometric transformations, 3D viewing.

Unit–I

Basic of Computer Graphics: Introduction to computer graphics, Applications of computer graphics, Display devices, Raster scan systems, Graphics input devices, Graphics software and standards.

Unit–II

Graphics Primitives: Points, lines, circles as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes.

Unit–III

2D Transformations and Viewing: Transformations, matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping, polygon clipping.

Unit–IV

3D Transformations & Introduction to Curves: curved lines and surfaces, spline representation, cubic spline interpolation methods, Bezier curves and surfaces, B-spline curves. 3D transformations: 3D scaling, rotation and translation, composite transformation, Projection: parallel and perspective.

Unit–V

Introduction to Multimedia: Introduction to multimedia, Multimedia computer system, Multimedia components, Multimedia terminology: communication modes, media types, Multimedia networks, Applications of multimedia, distributed multimedia systems, Synchronization

COURSE OUTCOMES

1. Explain various applications of computer Graphics.
2. To be able to understand a graphics processing system.
3. To able to under and implement computer graphics algorithms.
4. To be able to implement 3D graphics primitives 5. To be able to understand and use multimedia aids.

TEXT BOOKS:

1. Steven Harrington, Computer Graphics, A programming approach second Edn.
2. Computer Graphics; Principles and practice; Second Edition in C; J. D. Foley, A.Van Dam, S. K. Feiner and J. F. Hughes; Addison Wesley, 1997.

REFERENCE BOOKS:

1. Rogers, Procedurals elements of Computer Graphics, McGraw hill.
2. Newman and Sproul, Principle of interactive Computer Graphics, McGraw Hill.
3. John F. Koegel Buford, Multimedia Systems, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Renewable Energy Sources **Max Marks: 100**

Course Code: OEC-CE-685/PCC-EE-421 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits 3(3-0-0)

Course Objective: The course is designed to give knowledge of various renewable energy sources, systems and applications in the present context and need.

Unit-I

Energy Scenario in India, Renewable and Non-renewable Energy sources, Causes of Energy Scarcity, Solution to energy Scarcity, Need for Renewable Energy, Advantages and Disadvantages of Renewable energy, Renewable Energy statistics worldwide and India.

Unit-II

Solar energy, solar photovoltaic, PV Technologies-Amorphous, monocrystalline, polycrystalline, V-I characteristics of a PV cell, PV module, array, Maximum Power Point Tracking (MPPT) algorithms, Concentrated Solar Power, types of collectors, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, Application of Solar Power, Economic Policies to Promote Solar Energy.

Unit-III

Introduction, Electricity Generation using Wind Energy Generators (WEG), Evaluating Wind Turbine Performance, Wind Potential, Wind Energy in India, Wind Turbine Size and Power Ratings, Advantages of Wind-Generated Electricity, Cost Issues, Environmental Concerns, Supply and Transport Issues.

Unit-IV

Bio energy, Types of Bio Gas Plants, tidal energy, classification of Tidal Plants, ocean thermal energy systems, Open OTEC Cycle, Closed OTEC Cycle. Introduction to Magneto Hydro Dynamics (MHD) Power & fuel cells.

Unit-V

Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome:

After learning the subject, student will be able to:

1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources
2. Demonstrate the knowledge of physics of solar power generation and the associated issues.
3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.

4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.
5. Demonstrate the ways by which energy can be stored in different forms.

Text books/ References:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
2. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
3. Non-conventional energy resources, Shobh Nath Singh, Pearson India 4. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
5. Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Energy Audit and Management **Max Marks: 100**

Course Code: OEC-CE-686/PEC-EE-622 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits 3(3-0-0)

Course Objective: This course gives an overview of various aspects of conservation, management& audit of electrical energy.

Unit-I

Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, longterm energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change. Energy Conservation, Energy Conservation Act and its features.

Unit-II

Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

Unit-III

Energy Efficiency in Electrical Systems: Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

Unit-IV

Energy Efficiency in Industrial Systems: Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fansand blowers: Types, performance evaluation, efficient system operation, Pumps and Pumping System: Types, performance evaluation, efficient system operation. Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling

Unit-V

Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lightingcontrols, energy saving potential of each technology.

Course Outcomes

At the end of this course, students will demonstrate the ability to

1. Understand the current energy scenario and realize the need for new reforms to efficiently manage the energy resources.
2. Learn various auditing techniques used for proper energy management.
3. Realize how energy conservation could be done in Electrical Systems by managing the energy losses and malpractices.
4. Realize how energy conservation could be done in Industrial Systems by finding out the factor affecting the performance of various industrial devices and mitigating the same.
5. How electrical energy management could be achieved using new energy efficient devices.

Text/Reference Books

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book1, General Aspects (available online)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book3, Electrical Utilities (available online)
3. **S. C. Tripathy**, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.
4. Success stories of Energy Conservation by BEE, New Delhi (12.www.bee-india.org)

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Analog Communication Systems **Max Marks: 100**

Course Code: OEC-CE-687/PCC-ECE-423 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits 3(3-0-0)

Objective: The main thrust in this course is on making students familiar with basic communication principles and Technologies in vogue. The stress is on the applied Communication with reference to the relevant technologies.

Unit-I

Introduction to communication systems: Elements of an Analog Communication System, Communication Media and their Characteristics, channel capacity, Bandwidth, Shannon Capacity Relationship. Concept of time domain and frequency domain representation of signals. Fourier series expansion and Fourier Transform of some fundamental Signals.

Unit-II

Amplitude Modulation (AM): Concept of Modulation, Need for modulation, Amplitude modulation, Frequency spectrum of AM Waves, Representations of AM waves, Power relation in AM waves, Types of AM- Double sideband techniques and Single Sideband Techniques. SSB generation and Detection, DSB Generation and Detection, Numerical on Power calculations and Spectral analysis of AM.

Unit-III

Frequency Modulation (FM): Concept of Angle Modulation, Introduction to FM, Expression for Monotone FM, Types of FM, Power relations in FM, Spectrum of wideband FM, Bandwidth calculation in FM, Generation Methods of FM- Direct and Indirect, Detection methods of FM signal, PLL as FM detector. Numerical on power calculations, Bandwidth calculations and Spectralanalysis of FM.

Unit-IV

Radio Transmitters and Receivers: Block Diagram of AM/FM radio Transmitter, Characteristicsof Radio receivers- Sensitivity, Selectivity, Fidelity, Image Rejection (IFRR), Block Diagram for TRF Radio Receiver and Super-Heterodyne Receiver, ACG Controller and its configurations.

Unit-V

Noise analysis: Source of noise in analog communication systems, classification of noise - external noise, internal noise, Noise figure, signal to noise ratio (SNR), SNR and noise figure calculation in AM/FM systems, Concept of Pre-emphasis & De-emphasis. Numerical on noise and SNR calculations

Course Outcomes:

After completion of the course student will be able to:

1. Characterize different components of communication systems and find time domain and frequency domain representation of different signals.
2. Apply concept of modulation and carry out power calculations & spectral analysis of AM wave.
3. Carry out power calculations, Bandwidth calculations and Spectral analysis of FM wave.
4. Calculate Noise figure, signal to noise ratio (SNR) in AM/FM systems and analyze different noises present in communication systems.

Text Books:

1. **Taub and Schilling**, Principles of communication systems, TMH
2. **Simon Haykin**, Communication Systems, John Wiley & Sons.

Reference Books:

1. **Roddy and Coolen**, Electronic comm., PHI, New Delhi, 4th Edition, 2003.

Bruce Carlson et al, Comm. systems, McGraw Hill Int., 4th Ed

SEMESTER-VI

List of courses in Open Elective Course-II (OEC-II)

Course Title: Non-Conventional Energy Sources **Max Marks: 100**
Course Code: OEC-CE-688/PCC-ECE-627 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the course is to provide the students adequate knowledge of Power Generation from Renewable Energy Sources.

Unit-I

Introduction to Energy Sources: Energy scenario in India, Classification of Energy Resources, Renewable and Non-renewable Energy sources, Environment, Economy, Energy for sustainable development, Direct Energy conversion systems.

Unit-II

Hydro Energy: Renewable Hydro – potential, flow, duration and storage, Hydro Electric Power Plants, mini-micro hydro, small hydro power, types of turbines, generators & controls.

Unit-III

Wind Energy: Wind energy, potential, Site selection, Expression of power in the wind, Wind energy Conversion Systems. Types of wind Mills (Horizontal and Vertical Axis Wind Mill). Forces on Blades and Torque of Wind Mill. Lift Forces & drag Forces, wind mill generator, local control and storage.

Unit-IV

Solar Energy: Solar energy, Principle Of conversion of solar radiations into heat. Extra-terrestrial and inter-terrestrial regions, solar photovoltaic Cell, Applications of solar energy systems, Solar Water Heater, Solar Cookers, Solar Pumping

Unit-V

Other Renewable forms of energy: Bio energy, Biomass energy conversion Technologies. Methods for obtaining energy from Biomass, wave & tidal energy, ocean thermal energy systems (OTEC). Magneto Hydro Dynamic Power Generation (MHD) & fuel cells, geothermal resources, Geothermal Energy Conversions.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the importance of non-conventional energy resources for the present energy scenario.
- **CO2.** Understand the working criteria of hydro power generation.
- **CO3.** Acquire knowledge about wind energy conversion system for power generation.

CO4. Analyze solar energy conversion technologies.

CO5. Study other non-conventional sources of energy like geothermal resources, biomass, etc.

Text Books:

1. **Sukhatme S. P. and Nayak J. K.** Solar Energy, Tata McGraw Hill, New Delhi.
2. **Elgerd O. I.** Electrical Energy System Theory, Tata McGraw Hill, New Delhi.

Reference Books:

1. **Singal R. K.,** Non-Conventional Energy Sources, Kataria Sons, New Delhi.
2. **Gupta B. R.,** Generation of Electrical Energy, Khanna Publications.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

SEMESTER-VII

Course Title: Major Project-I **Max. Marks: 100**
Course Code: PROJ-CE-721 **University Examination: Nil**
Duration of Exams: 3 hours **Internal Assessment: 100**
Credits: 3 [0-0-3]

During semester VII every student shall be allotted a Major Project-I pertaining to his/her stream under the supervision of an allotted mentor. Students are required to report in their respective departments to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project-I under the supervision of an allotted mentor. Students are required to complete the Major Project-I during semester VII. Major Project-I shall be evaluated internally as per university statutes by a committee consisting of:

i) Head of the Department
ii) One member nominated by Principal
iii) Coordinator(s)/Supervisor(s) of minor project/training

SEMESTER-VII

Course Title: Design of Steel Structure **Maximum Marks: 100**
Course Code:PCC-CE-722 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to provide basic knowledge to the studentsabout the principles of energy management in buildings

UNIT-I

Energy use in Buildings: Energy use in Buildings, Factors effecting Energy use, Energy Conservation options. External Factors – Climate, Climatic Zone, Building Orientation, Shading, Sizing of Shading Devises. Thermal Comfort: Criteria and various Parameters, Psychometric Chart, Indoor air quality; Requirements in residential, Commercial, Hospital Buildings.

UNIT-II

Heat Transmission in Buildings: Heat Transmission in Buildings: Surface Coefficient, Air cavity, Internal and External Surface, Overall Thermal Transmittance Walls and Windows, and Packed Roof, Heat Transfer due to ventilation/ infiltration, Internal Heat gains, Solar Temperature, Steady State Method (for Trombe Wall, Water wall and Solarium),

UNIT-III

Lighting Fundamentals &Day Lighting Use: Lighting Fundamentals, Visual Performance, Calculations of Lighting Levels, Energy Efficient Lighting. Day Lighting Use: Estimation of available Daylight, Day lighting Systems, Advantages and Limitations of Day light Use.

UNIT-IV

ASHRAE Methods and standards for estimates of Heating and cooling and Ventilation, Requirements of Different use Buildings, Air Quality control Equipments, Distribution Systems for Conditioned Air.

UNIT-V

Typical Designs of Selected Buildings in various Climatic Zones, Thumb Rules for Design of Building systems; Building Codes.

Course Outcomes: Upon the completion of the course, the students will be able:

1. To understand the energy use and conservation options in buildings.
2. To understand the concepts of heat transmission in building
3. To learn the lightning fundamentals and day lightning use and estimation.
4. To understand the ASHRAE Methods and standards for estimates of Heating and cooling and Ventilation
5. To designs the Selected Buildings in various Climatic Zone

TEXT BOOKS

1. M S Sodha, N.K. Banaal, P.K.Bansal, A.Rumaar and M.A.S. Malik, Solar Passive: Building Science and Design,Pergamon Preen (1986).

1. Jamee; L. Threlked, Thermal Environment Engineering, Prentice Hall, INC-, Raglevood Cliffs, New Jersey (1970).

3. T.A. Markus and R.N. Morris, Building, Climate and Energy Spottwoode Ballantype Ltd-, London U.K. (1980)

REFERENCE BOOKS:

1. Solar Thermal Energy Storage, H. P. Garg et.al, D. Reidel Publishi

SEMESTER-VII

Course Title: Entrepreneurship Development &Management **Maximum Marks: 100**
Course Code: HSMC-CE-723 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Objective: Course is designed to acquaint the students with the skills required to become entrepreneurs and to create an awareness of the need for systematic management of projects.

Unit-I: Entrepreneurship Development

Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

Unit-II: Entrepreneurship Support System

Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centres and Other supporting agencies.

Unit-III: Project Report Preparation

Identifying business opportunities, Project report and its importance, various contents of project report: managerial and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

Unit-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, Pricing strategies, Channel strategies and Promotional strategies.Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

Unit-V

Introduction To Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation. Introduction to Financial Management: source of finance and Working Capital management.

Course Outcome

After completion of this subject student will be able to:

1. Understand the meaning, objectives and types of entrepreneurs.
2. Understand the Entrepreneurship Support System.
3. Prepare to Project Report.
4. Analyze business opportunities, technical feasibility and financial viability in context to entrepreneurship.
5. Plan the business.

Text Books/Reference:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1998).
3. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
4. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).
5. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-VII

Course Title: Industrial Training **Max. Marks: 25**
Course Code: PCC-CE-731 **University Examination: Nil**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Details:

At the end of semester IVth and VIth students are required to attend an Industrial Training for 6 weeks duration, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester V^{th} and VII^{th} university examination. The examination of Industrial Training shall be conducted during semester V^{th} and VII^{th} examination.

Table 3: Distribution of Weightage for Minor project & Industrial Training of 25 marks.

Component	**Weightage**
Industrial Training	25
Total	25

SEMESTER-VII

Course Title: STAAD Pro/CAD Lab **Max. Marks: 50**
Course Code: PCC-CE-732 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objectives:
To analysing and designing civil engineering structures such as buildings, bridges, and plane and space trusses.

List of Practical's:

1. AUTOCAD commands, drawing of lines, circles and different types of polygon.
2. Drawing plan, elevation and cross-sectional views of one storey residential building.
3. Drawing of staircases.
4. Drawing plan, elevation and cross-sectional views of two storey residential building.
5. Drawing plan, elevation and cross-sectional views of five story commercial building.
6. Introduction to STAAD, its Components, structures and analytical models.
7. Creating Basic Geometry (Beams/Columns), Architectural Drawing – Entering Coordinates. Creating some Geometry parts (Beams/Columns) in
8. Architectural Drawing by Snap/Node Beam Command
9. Creating Geometry of Structures using Split Beam and Stretching of Members. Creating Geometry of Vertical and Horizontal Bracings in the Structure. Creating Geometry of Curved Beams/Solids in the Structure.
10. Selection of Members, Creating Group of Members, Assigning of Property to Members, For Steel Members – Using Section Database.
11. For Concrete Members – Using Define Tab. Creating User Table. Using Section Wizard
12. Using Specification Commands in members- beam. Using Specification Command as Truss, Tension and Compression members. Using Master/Slave Command in Staad. Creating Different types of Supports in Staad using Create Support Command.

Laboratory outcome
To prepare the students to solve problems including design elements and related to their course work.

SEMESTER VII

Course Title: Seminar **Max. Marks: 50**
Course Code: PCC-CE-733 **University Examination: Nil**
Duration of Exams: 2 hours **Internal Assessment: 50**
Credits: 1 [0-0-0]

Details:

During semester VI students are required to choose any topic that pertains to civil engineering and get the approval from the coordinator of the same semester or Head of the Department. The date on which the seminar will be held will be decided by head after consulting the coordinator. The student has to give power point presentation before the students and the committee of the faculty members, framed by HoD and has to reply questions and queries asked by the faculty members of the committee. Marks will be given on overall performance in presentation and response to the queries asked to the student. The coordinator of the seventh semester will be overall in-charge.

SEMESTER-VII

List of courses in Professional Elective Course-III (PEC-III)

Course Title: Foundation Engineering **Max. Marks:100**
Course Code: PEC-CE-761 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objectives. To understand the design aspects of foundation and to evaluate the stress developed in the soil medium. Understand the framework of soil investigation.

Unit I:
Types of Foundations: Foundation, Types of foundation, Factors governing location and depth of foundation, selection of foundation, plate load test, standard penetration test.

Unit II:
Capacity and Settlements of Shallow Foundations: Terzaghi's theory of bearing capacity – general and local shear failure - effect of water table – design of footings – settlement of footings - immediate and time dependent settlement – permissible limits – differential settlement, introduction to codal provisions.

Unit III:
Deep Foundations: Classification and selection of piles – static and dynamic formulae for single pile capacity – efficiency and capacity of pile groups – design of pile group – settlement of pile groups– load test on piles.

Unit IV:
Slope Stability: Failure of infinite and finite slopes – Swedish circle method – Factor of safety - slope stability of earth dams, introduction to Bishop's method – IS codes.

Unit V:
Soil Exploration: Objective of site investigation - reconnaissance – detailed site investigation - methods of exploration – geophysical methods - seismic refraction survey. Depth of exploration analysis and design of excavations, retaining walls, cuts & excavations and sheet piles.

Course Outcomes:-On completion of this course, the students will be able to

1. Comprehend and utilize the geotechnical literature to establish the framework for foundation design.
2. Plan and implement a site investigation program including subsurface exploration to evaluate soil/structure behavior and to obtain the necessary design parameters.
3. Carry out slope stability analysis for various fills and slopes.
4. Determine allowable bearing pressures and load carrying capabilities of different foundation systems.
5. Understand theories of earth pressures and designing of retaining walls.

Text Books

1. Arghese P.C (2009), Foundation Engineering 1st Edition, Prentice-Hall of India Private Limited. ISBN: 978-81-203-2652-1.
2. Arun Kr. Jain, B.C. Punmia, Ashok Kr. Jain (2005), Soil Mechanics and Foundations Sixteenth Edition, Laxmi Publications. ISBN: 978-81-700-8791-5.

Reference Books

1. ashi K. Gulhati&ManojDatta (2005), Geotechnical Engineering 1st edition, Tata McGraw Hill Ltd. ISBN: 978-00-705-8829-5.
2. Donald P Coduto, William A. Kitch, Man-chu Ronald Yeung (2010), Geotechnical Engineering: Principles and Practices 2nd revised Edition, Pearson Education. ISBN: 97801-313-5425-8.
3. Joseph E. Bowles (2006), Foundation Analysis and Design 5th edition, McGraw-Hill, New York. ISBN: 978-00-711-8844-9.
4. Braja M. Das (2007), Principles of Foundation Engineering 6th Edition, Nelson Engineering. ISBN: 978-81-315-0202-0.
5. Ramamurthy (2010), Engineering in Rocks for Slopes, Foundations and Tunnels, PHI Learning Private Limited. ISBN: 978-81-203-4168-5.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

SEMESTER-VII

Professional Elective Course-III (PEC-III)

Course Title: Construction Equipment and Automation **Max. Marks:100**
Course Code: PEC-CE-762 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Objective: The objective of this course is to understand the functioning of different types of equipments use in construction industry and their productivity.

Unit-I

Introduction: Conventional construction methods Vs Mechanized methods and advantages of latter.

Unit-II

Construction Equipment's: -Equipment for Earthmoving, Excavators, Backhoe Loaders, Bulldozers, Skid Steer Loaders, Motor Graders, Trenchers, cranes etc.

Unit-III

Dewatering equipments, Concrete mixing equipments, transporting & placing, plastering machines;

Unit-IV

Grouting and lifting Equipment's: -Prestressing jacks and grouting equipment; Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials.

Unit-V

Equipment Productivities: - Equipment Productivities; Use of Drones for spread out sites; Use of robots for repetitive activities.

Course Outcomes:-Students will be able to

1. Associate the knowledge of construction of substructures and superstructures.
2. Demonstrate basic knowledge about Construction equipment and machinery
3. Discuss about hauling and conveying equipment.
4. Demonstrate the ability to identify and manage with respect to time and their motion with respect to their movements.
5. Understand the productivity of different equipments.

Text Books:

1. ConstructionEquipment and Its Management - – 2002 by S C Sharma
2. Construction Planning, Equipment and Methods - Robert Peurifoy

References Books:

1.Project Planning and Control with PERT and CPM-B.C. Punmia

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester-VII
Professional Elective Course-III (PEC-III)

Course Title: Open channel Flow **Max. Marks: 100**
Course Code: PEC-CE-763 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Objective:-The objective of the course is to provide a physical understanding of phenomena and concepts in advanced water flows and to introduce calculation methods to analyze a number of important hydraulic problems. The course deals mainly with free-surface flows with emphasis on open channel hydraulics.

Unit I
Difference between open channel flow and pipe flow, geometrical parameters of a channel, continuity equation. Uniform flow Chezy's and Manning's equations for uniform flow in open channel, velocity distribution, most efficient channel section.

Unit II
Energy and Momentum Principles
Critical depth, concepts of specific energy and specific force, application of specific energy principle for interpretation of open channel phenomena, flow through vertical and horizontal contractions.

Unit III
Non-Uniform Flow in Open Channel
Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods, flow in curved channels.

Unit IV
Hydraulic Jump
Surges, Water Waves, Classical hydraulic jump, evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds, equation of motion for unsteady flow, open channel surge, celerity of the gravity wave, deep and shallow water waves.

Unit V
Spatially-varied flow
SVF with increasing discharge, differential equation of SVF with increasing discharges, control point, classification and solutions, profile computation, SVF with decreasing discharge, differential equation for SVF with decreasing discharge, computations.

Learning Outcomes:-For a passing grade the student

1. Possess a solid understanding of the basic phenomena and processes that govern free-surface flows.
2. Be able to formulate advanced models based on the governing equations for free-surface flows and to solve the equations for commonly encountered flow situations.
3. Be able to analyze complex flow problems using dimensional analysis and to develop rules for experiments with scale models.
4. In detail understand the impact of flowing water on submerged bodies and structures.
5. Have understanding of the Spatially-varied flow

Text Books:

1. Fluid Mechanics – A.K. Jain (Khanna Publication)
2. Open Channel Flow – Subramanya (Tata McGraw Hill, New Delhi)

Reference Books:

1. Engineering Fluid Mechanics (including Hydraulic Mechanics) (2nd
2. Edition) – Garde, R.J., and A.G.
3. Mirajgaoker (Nem Chand & Bros., Roorkee, 1983)
4. Flow Through Open Channels – Ranga Raju, K.G. (Tata McGraw Hill, New Delhi, 1993)
5. Experimental Fluid Mechanics (Vol. 2) – Asawa, G.L.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Semester-VII

Professional Elective Course-III (PEC-III)

Course Title: Rural Construction Technology **Max. Marks: 100**
Course Code: PEC-CE-764 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Objective: the aim of this course to understand of technology of walls roof and how to construct water supply and sanitation

UNIT-I

Introduction to Technology/ Materials: Scope and concept of appropriate technology as applicable to civil engineering, importance of low cost construction in rural areas. Materials: Importance of locally available material, bamboo, tree bushes, grass, mud, sand etc., treatment of materials for protection against termite, decay and for increasing their strength.

UNIT-II

Technology for Walls/Roofs: Construction of plane and block mud walls, bamboo/bush reinforced mud walls, water proofing of mud walls, thickness of mud walls, mud plaster. Use of hollow blocks in the construction of walls for insulation Thatched Roofs: Constructional methods of thatched roofs, fire proofing of thatched roof, low cost treatment of thatched roof.

UNIT-III

Low Cost Housing: Planning and construction of low cost houses cluster of houses, ventilation, low cost doors, construction of mud floors, construction of smokeless chullaha, construction of cement treated gunny bags – sheds and storage bins, construction of sheds for animals

UNIT-IV

Rural Water Supply and Sanitation: Construction of open well, chlorination of open well, construction of hand pumps, constructions of bathing cubicals, construction of low cost drains. Construction of low cost latrines, construction of pre-fabricated septic tanks, and construction of soak pits.

UNIT-V

Miscellaneous: Construction of fair weather roads, construction of bunds. Low lift pumps, Ferro-cement storage tanks, Ferro-cement grain bins, red clay tiles for roof and floors, construction of rapid burning low cost brick kilns solar seasoning plants. Solar cookers, fiber corrugated sheets, individual and comm. Unity biogas plants. Concrete blocks for wall construction, Brick, panels, precast lintels, slabs and beam, water harvesting techniques etc.

Learning Outcomes: Students will be able to

1. Understand the different materials and their characteristics
2. Understand the construction of mud wall.
3. Know about the low cost housing.
4. Acquire knowledge of rural water supply and sanitation.
5. Know about the new technological innovation and different materials used in constructions.

Text Books:-

1. "Building Construction" By: Arora, Dhanpat Rai and Sons'.
2. "A Text of Building Construction" By: SPD Suhil Kumar.
3. "Construction Technology " By: R. Choudary and R. Greano
4. "Rural Technology" By: R.D Punia, U.N. Roy and Sanjay Mahajan, Satya Prakashn
5. "Rural Education and Technology" By: Verma and S.K. Jolaha, Deep and Deep Publications

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Semester-VII

Professional Elective Course-III (PEC-III)

Course Title: Structural Dynamics **Max. Marks: 100**

Course Code: PEC-CE-765 **University Exam: 60**

Duration of Exams: 3 hours **Internal Assessment: 40**

Credits: 3 [2-1-0)

Course Objective: Learn how to model discrete single-degree and multiple-degree vibratory systems and calculate the free and forced response of these systems. Calculate the mode shapes and frequencies for the free response of continuous vibratory systems and use modal methods to calculate the forced response of these systems.

Unit I:

Introduction: Types of dynamic loads, Basic background of methods available and motivation for structural dynamics. Earthquake excitation, response history and construction of response spectra, Response spectrum characteristics, tripartite plot, and design spectrum

Unit II:

Dynamics of Single Degree-of-Freedom Structures: Dynamic equation of equilibrium, Free vibration of single degree of freedom systems, Forced vibration: harmonic and periodic loadings, Dynamic response functions, force transmission and vibration isolation, SDOF response to arbitrary function

Unit III:

Dynamic Analysis of Linear MDOF Systems: Introduction, modal analysis, Response-history for earthquake excitations using modal analysis, Response spectrum analysis for peak responses, Concept of Caughey damping as a general type of proportional damping

Unit IV

Free Vibration Response of MDOF Systems: Un-damped systems, natural modes and their properties, Numerical solution for the eigen value problem, Solution of free vibration response for undamped systems, Free vibration analysis of systems with damping.

Unit V:

Generalized Single Degree of Freedom Systems: Basic concepts, mass spring system, Lumped mass systems, Systems with distributed mass and elasticity, Rayleigh's method, shape function selection.

Course Outcomes:-Students who successfully complete the course will be able to

1. Have an ability to apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response.
2. Understand the Dynamics of Single Degree-of-Freedom Structures.
3. Understand the Dynamic Analysis of Linear MDOF Systems.
4. Understand the Free Vibration Response of MDOF Systems
5. Have an ability to identify, formulate and solve engineering problems.

Text Books

1. Introduction to Structural Dynamics – J. M. Biggs
2. Dynamics of Structure – Anil K Chopra

Reference Books:

1. Elements of Earthquake Engineering – Jai Krishna and A. R. Chandrasekharan
2. Soil Dynamics – Shamsher Prakash
3. Dynamics of Structures – R.W. Clough& J. Penzien
4. Earthquake Resistant Design of Structure – Pankaj Aggarwal& Manish Srikhande
5. Structural Dynamics – Mario Piaz

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

SEMESTER-VII

Professional Elective Course-III (PEC-III)

Course Title: Port and Harbour Engineering **Max. Marks: 100**
Course Code: PEC-CE-766 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Objective: The objective of this course is to understand design of Harbour related structures and different waterways and port.

Unit-I

Introduction: Harbour Planning: Types of water transportation, water transportation in India, requirements of ports and harbours, classification of harbours.

Unit-II

Design of Harbour:- selection of site and planning of harbours, location of harbour, traffic estimation, master plan, ship characteristics, harbour design, turning basin, harbour entrances.

Unit-III

Dock and Investigation: type of docks, its location and number, Site investigations –hydrographic survey, topographic survey, soil investigations, current observations, tidal observations; Docks and Repair Facilities.

Unit-IV

Designand construction of different comp.:-.Design and construction of breakwaters, berthing structures - jetties, fenders, piers, wharves, dolphins, trestle, moles, Harbour docks, use of wet docks, design of wet docks, repair docks, lift docks, dry docks, keel and bilge blocking, construction of dry docks, gates for dry docks,

Unit-V

Port and waterways: - Port development, port planning, port building facilities, transit sheds, warehouses, cargo handling facilities, container handling terminal facilities, shipping terminals, inland port facilities. Inland waterways, Inland water transportation in India, classification of waterways, economics of inland waterways transportation, national waterways.

Course Outcomes:- Students will be able to

1. Explain the significance of ports and harbours as a mode of transport.
2. Demonstrate the fundamental principles of wave hydrodynamics and port cargo handling.
3. Understand the different types of Docks and their investigation
4. Design, plan and integrate port and harbour infrastructure.
5. Explain the construction, maintenance and renovation aspects of ports and inland waterways

Text Books:

1.Docks and Harbour Engineering Paperback – 2012 by S.P. Bindra

References Books:

1**.**Harbour Dock and Tunnel Engineering Paperback – 2016 by R.Srinivasan

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester-VII
Professional Elective Course-III (PEC-III)

Course Title: Ground Improvement Technique **Max. Marks: 100**
Course Code: PEC-CE-767 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Course Objectives:-To understand problems related to expansive soils and to identify preventive measures for mitigating effect of soil expansion on structures founded on expansive soil. Find out proper methods of ground improvement. Understand various soil engineering problems and to use geotextiles and stabilizers for soil improvement.

Unit I:

Origin, Occurrence and Identification of Expansive Soils: Occurrence and distribution in India - Moisture equilibrium - Soil, structure, environmental interaction - Distress symptoms case histories - Soil Structure - Clay mineralogy Swell potential - Field exploration - laboratory tests for identification.

Unit II:
Chemical stabilization and Special Foundation: Mechanical alteration – Sand cushion technique - CNS concept – Chemical stabilization with lime, fly ash and cement – Special foundations – Underreamed piles – Straight-shafted drilled piers - Belled piers – Granular pile-anchors.

Unit III: Introduction to Ground Improvement Techniques: Need and objectives of ground improvement, classification of ground modification techniques, suitability and feasibility, emerging trends in ground improvement, methods of de-watering, sumps and interceptor ditches, single, multi stage well points, vacuum well points, Horizontal wells, foundation drains, blanket drains, criteria for selection of fill material around drains, Electro-osmosis.

Unit IV:
Stabilization: Soil improvement by adding materials, lime, flyash, cement and other chemicals and bitumen, sand column, stone column, sand drains, prefabricated drains, lime column, soil-lime column, stabilization of soft clay or silt with lime, bearing capacity and settlement of treated soils, improvement in slope stability, control methods. Introduction to geotextiles and geo-membranes, applications of geotextiles, design methods using geotextiles, geogrids, geonets, geomembranes, geo-tubes.

Unit V:
Grouting: Introduction, suspension grout, solution grout, grouting equipment's and methods, grouting, design and layout granular piles–ultimate bearing capacity and settlement, method of construction, load test.

Course Outcomes: On completion of this course, the students will be able to

1. Know the physical & mineralogical properties of expansive soil.
2. Conduct tests for identification of swelling soil.
3. Design suitable method for improving properties of expansive soil.
4. Choose correct method for ground improvement.
5. Design grouting process for various soil engineering problems

Text Books

1. F.H.Chen (1995), Foundations in Expansive Soils, Elseivier Publications. ISBN: 978-04-4443036-6.
2. NiharRanjanPatra (2012), Ground improvement techniques, 1st Edition, Vikas Publishing House. ISBN: 978-93-259-6001-5.
3. Nelson, John D. Nelson, Ron Miller (1997), Expansive Soils: Problems and Practice in Foundation and Pavement Engineering New edition, Wiley-Interscience. ISBN: 978-04-711-8114-9.

Reference Books

1. P. Purushothama Raj (1999), Ground Improvement Techniques 1st Edition, Laxmi Publications. ISBN: 978-81-318-0594-7.
2. Rao (1990), Engineering with Geo-synthetics, Mcgraw-hill Education. ISBN: 978-00-746-0323-9.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

SEMESTER VII
List of courses in Professional Elective Course-IV (PEC-IV)

Course Title: Pre-stressed Concrete and Bridge Design **Max. Marks:100**
Course Code: PEC-CE-768 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Course Objectives: To analyse sections for flexure and deflection and the Losses of pre stressed members. Also analyse the Transfer of Pre-stress in Pre tensioned Members and Anchorage Zone Stresses in Post Tensioned Members and Design and detailing of plate girder, steel truss bridges

Unit I:
Basic Principles of Pre-Stressing Systems Basic concepts of pre-stressing, High strength concrete and steel, Stress-strain characteristics and properties, Various pre-stressing systems, Pre-tensioning and Post- tensioning systems with anchorages, Advantages and limitations of pre=stressed concrete.

Unit II:
Analysis of Sections for Flexure and Losses of pre-stress: Basic assumptions, Analysis of stresses in concrete due to pre- stress and loads for different types of cross section, Pressure line or thrust line, Cable profile, Concept of load balancing, Cracking moment. Nature of losses in pre-stress, Various losses encountered in pre-tensioning and post tensioning methods, Deflection, Factors influencing deflection, Elastic deflection under transfer loads

Unit III:
Flexural and Shear Strength of Prestressed Concrete Sections: Types of flexural failure, IS code recommendations for flexure, Ultimate flexural strength of section. Shear and principal stresses, Ultimate shear resistance of prestressed concrete members, Shear reinforcement.

Unit IV:
Transfer of Prestress in Pre-tensioned Members and Anchorage Zone Stresses in Post Tensioned Members Transmission of pre-stress in pre-tensioned members, Transmission length, Bond stresses, Codal provisions for bond and transmission length, Anchorage stress in post- tensioned member. Bearing stress and bursting tensile force, IS code provisions.

Unit V:
Fundamentals of bridge engineering and design: Introduction ,History of Bridges - Components of a
Bridge and its definitions- Classification of Road Bridges - Selection of Site and Initial Decision Process - Survey and Alignment; Geotechnical Investigations and Interpretations. River Bridge: Selection of Bridge site and planning - Collection of Bridge design data - Hydrological calculation Road Bridges - IRC codes - Standard Loading for Bridge - Transverse distribution of Live loads among deck longitudinal - Load combinations for different working state and limit state designs Railway Bridges. Selection of main bridge parameters, design methodologies -Choices of superstructure types, Different types of superstructure (RCC and PSC); Longitudinal Analysis of Bridge.- Transverse Analysis of Bridge- Temperature Analysis, Distortional Analysis, Effects of

Differential settlement of supports Reinforced earth structures, Design of Truss Bridges – Design of Plate girder bridges.

Course Outcomes:-On completion of this course, the students will be able to

1. Analyze sections for flexure and deflection.
2. Analyze the Losses of pre stressed members.
3. Analyze the Transfer of Prestress in Pre tensioned Members and Anchorage Zone Stresses in Post Tensioned Members.
4. Understand IRC Code and Design and detailing of plate girder and steel truss bridges.
5. Design the different types of bridges.

Text Books

1. Raju, N. K., "Pre-stressed concrete", Tata McGraw Hill, New Delhi, 1st Edition, 2012.
2. Ramachandra (2004), Design of Steel structures, 4th Edition, Standard Publishers Distributors, ISBN: 9780071544115.

Reference Books 1. Ramamruthum, S., "Pre-stressed Concrete", DhanpatRai Publishing Company (P) Ltd., New Delhi, 2003. 2. Lin, T. Y., Burns, N. H., "Design of pre- stressed Concrete Structures", John Wiley and Sons. New York, 3rd Edition, 1981
3. Duggal S. K. (2008), Design of Steel Structures, 3rd Edition, Tata McGraw-Hill, ISBN: 9780070260689.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

SEMESTER VII
Professional Elective Course-IV (PEC-IV)

Course Title: Traffic Engineering and Management **Max. Marks: 100**
Course Code: PEC-CE-769 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Course Objectives: To teach the concepts of traffic studies, traffic facilities and their regulations and management and understand the methods for efficient management of traffic in urban roads.

Unit I
Traffic Studies: Road user and Vehicle Characteristics - Traffic Studies -Traffic volume and composition - speed, Headway - Concentration and Delay & Flow principles - Capacity and level of service.

Unit I
Traffic Facilities: Signals - Islands - Types and General layout of at-grade and grade separated intersections.

Unit III
Traffic Regulations and Management: Traffic signs and markings - Parking practices - Traffic management measures. Simulation: Fundamental principle, application of simulation techniques in traffic engineering - formulation of simulation models, Case studies. Formulation of system model.

Unit IV
General Principles and Flexible Pavement Design: Factors affecting pavements stability – equivalent single wheel load – vehicle, soil, traffic & Climatic factors - stress distribution in different conditions - CBR method of design - AASSO method & Burmister design method.

Unit V
Rigid Pavement Design: Stresses in concrete pavement – IRC method – design of steel reinforcements – Function of joints, design of joints in concrete pavements - Joint Fillers and sealant.

Course Outcomes: On completion of this course, the students will be able to

1. Perform traffic studies.
2. Know importance of traffic management.
3. Identify the specification of traffic facilities.
4. Design the flexible pavement.
5. Design the rigid pavements

Text Books

1. Kadiyali.L.R. (2008), Traffic Engineering and Transportation Planning, Khanna Publishers, ISBN-9788174092205.
2. ChakroborthyPartha, and Das Animesh, (2003), Principles of Transportation Engineering, Eighth Printing, Prentice-Hall of India, ISBN-9788120320840.

Reference Books

1. Khisty.C.J., and Lall.B.K., (2003) "Transportation Engineering", Indian Edition, Prentice-Hall of India , ISBN- 9788120322127.
2. Papacostas.C.S., and Prevedouros.P.D., (2001) "Transportation Engineering and Planning", Indian Edition, Prentice-Hall of India , ISBN- 9788120321540.
3. Garber. Nicholas J., and Hoel. Lester A., (2009), Traffic & Highway Engineering, Fourth Edition, Cengage Learning, ISBN-9780495082507.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

SEMESTER VII

Professional Elective Course-IV (PEC-IV)

Course Title: Air and Noise Pollution and Control **Max. Marks: 100**
Course Code: PEC-CE-770 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Course Objectives: To understand the aspects of atmospheric pollution and its flow and know about the issues such as atmospheric composition, monitoring, acidic deposition, urban air quality

Unit I

Sources and Effects of Air Pollution: Classification of air pollutants, Particulates and gaseous pollutants, Sources of air pollution, Source inventory, Effects of air pollution on human beings-materials-vegetation-animals, global warming-ozone layer depletion, Sampling and Analysis, Basic Principles of Sampling, Source and ambient sampling, Analysis of pollutants ,Principles.

Unit II

Transport of Air Pollution: Elements of atmosphere and dispersion of pollutants, Meteorological factors, Wind roses, Lapse rate, Atmospheric stability and turbulence, Plume rise , Dispersion of pollutions, Gaussian dispersion models, Applications.

Unit III

Control of Air Pollution: Concepts of control of air pollution, Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation, Selection criteria for equipment, gaseous pollutant control by adsorption & absorption, condensation, combustion, Pollution control for specific major industries.

Unit IV

Air Quality Management: Air quality standards, Air quality monitoring, Air pollution control efforts, Zoning, Town planning regulation of new industries, Legislation and enforcement, Environmental Impact Assessment.

Unit V

Noise Pollution & Control: Sound and Noise: Sources of noise pollution, environmental and industrial noise; effects of noise pollution, fundamentals of sound generation - propagation, sound measurement, sound level meters, types, components, Noise prevention & control measures, environmental and industrial noise, noise control legislation

Course Outcomes: On completion of this course, the students will be able to

1. The main chemical components and reactions occur in the atmosphere and examine the factors responsible for perturbing this.

2. The Implementation of the methods for monitoring and modeling spatial and temporal patterns of pollution
3. The air pollution issues at a range spatial scales and how these are relaxed.
4. The environmental impacts of atmospheric pollutants and assess their concentration.
5. Understand the measures to be taken to control noise pollution.

Text Books

1. M N Rao& H V N Rao (2007), Air Pollution, Tata McGraw-Hill Publishing Company, 26th reprint, New Delhi. ISBN: 0074518718
2. Noel De Nevers (2010), Air Pollution Control Engineering, 2nd Edition, Waveland Press, Inc., Long Grove, Illinois. ISBN: 978-1577666745

Reference Books

1. Singal, S.P. (2000), Noise Pollution and Control, First Edition, Narosa Publishing House, New Delhi.ISBN: 8173193630
2. Rao C.S. (2006) Environmental Pollution Control Engineering, 2nd edition, New Age International,New Delhi. ISBN: 9788122418354
3. William L.Heumann (1997), Industrial Air Pollution Control Systems, McGraw Hill Professional, New York.ISBN: 9780070314306

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

SEMESTER VII
Professional Elective Course-IV (PEC-IV)

Course Title: Rock Mechanics **Max. Marks: 100**
Course Code: PEC-CE-771 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3 [2-1-0)

Objective: This course is meant to provide an understanding to the students about index properties of rocks, failure and their applications.

UNIT–I:
Classification and Index Properties of Rocks: Genesis & Geological classification of rocks- Engineering classification of rocks masses, Index properties of rock systems

UNIT–II:
Rock Strength and Failure Criteria: Modes of rock failures - strength of rock - Laboratory and field measurement of shear, tensile and compressive strength- stress strain behaviour in compression - Mohr - coulomb failure criteria and empirical criteria for failure- Deformability of rocks.

UNIT–III:
Initial Stress and Their Measurements: Estimation of initial stresses in rocks - influence of joints and their orientation in distribution of stresses. Techniques for measurement of in-situ stresses

UNIT–IV:
Application of Rock Mechanics in Engineering: Simple engineering application - underground opening- rock slopes- foundation and mining subsidence

UNIT–V:
Rock Bolting: Introduction- rock bolt systems- rock bolt installation techniques - testing of rock bolts- choice of rock bolt based on rock mass condition.

Course Outcomes: On completion of this course, the students will be able to

1. Know the different index properties and strength criteria of rocks.
2. Understand the different mode of failure of rock
3. Calculate the stresses in rock
4. Understand the application of rock mechanics engineering.
5. Know about the rock bolting and applications.

Text Books:

1. Goodman P.T., Introduction to rock mechanics, john and sons, 1999.
2. Stillborg B**.,** Professional user Handbook for rock bolting, Tran. Tech Publications.

Reference books:

1. Engineering Rock Mechanics: An Introduction to the Principles by J. A. Hudson and J. P. Harrison
2. Rock Mechanics: For Underground Mining by Barry H.G. Brady
3. Fundamentals of Rock Mechanics, 4th Edition, John Conrad Jaeger, Neville G. W. Cook, Robert Zimmerman

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VII
Professional Elective Course-IV (PEC-IV)

Course Title: Flood Control and River Engineering **Max. Marks: 100**
Course Code: PEC-CE-772 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits:3[2-1-0)

Objective: This course is meant to provide an understanding to the students about diversion works, cross drainage works and measures for flood control.

UNIT-I
Flood Control: Introduction to flood and Flood problems, types of flood control measures, drainage of irrigation lands both saline and alkaline lands.

UNIT-II
Diversion Headwork and Cross Drainage Works: Selection of sites and layout, parts of diversion head works, types of weirs/Barrages, design of weirs' on permeable foundations, silt excluders and silt ejectors. Necessity of cross drainage works, their types and selection design of various types of cross drainage works such as aqueduct, siphon and super passage.

UNIT-III
Introduction to River Engineering: River Morphology -Bars; Bends and Meanders, Thalweg, Braiding; Bifurcations, Sediment Transport Mechanics -Bed forms, Bed Load transport, Transport of suspended sediment, Local Scour at Bridge Piers and other Hydraulic Structures.

UNIT-IV
Measurements in River: Critical Shear stress, Stage measurements, Channel geometry, Discharge, Sediment samplers and suspended and bed load measurement.

UNIT-V
River Protection and Training Works: Revetments, Dikes, Gabions, Spurs, Bank Protective measures and Bed control structures, Diversion and Cofferdams; River regulations systems; Dredging and Disposal, River restoration.

Course Outcomes: On completion of this course, the students will be able to

1. Understand the different flood control measures.
2. Know the different types diversion headwork and cross-Drainage work.
3. Know the terminology of river engineering and flood control measures.
4. Measure the discharge of a river
5. Understand the different River Protection and Training Works

Text Books/ Reference Books:

1. **Bharat Singh,** Fundamentals of irrigation engineering.
2. **Varshney, Gupta & Gupta,** Theory and design of irrigation structures

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER VII
Professional Elective Course-IV (PEC-IV)

Course Title: Transport Planning and Management **Max. Marks: 100**
Course Code: PEC-CE-773 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3[2-1-0)

Course Objectives: To teach the transportation planning process, trip generation and distribution methods and various techniques involved in traffic assignments, and introduce evaluation techniques based on economy and performance.

Unit I:
Transport Planning Process:
Scope – interdependence of land use and traffic – systems approach to transport planning – survey of existing conditions and forecasting future conditions. Transport survey – definition of study area – zoning survey – types and methods – inventory on transport facilities – inventory of land use and economic activities.

Unit II
Trip Generation: Factors governing trip generation and attraction rates – multiple linear regression analysis – category analysis – critical appraisal of techniques.

Unit III
Trip Distribution Methods: Uniform factor method, average factor methods – gravity model and its calibration – opportunity model.

Unit IV
Modal Split and Trip Assignment: Modal split – factors, advantages and limitations, logit model and its calibration. Traffic assignment – general principles – assignment techniques – all nothing assignment – multiple root assignment – capacity – restraint assignment – diversion curves

Unit V
Evaluation Techniques: Economic evaluation techniques – performance evaluation – rating and ranking methods – case studies in evaluation – rating and ranking methods – case studies in evaluation of transport projects – land use transport models – transport planning for medium and small sized towns.

Course Outcomes: On completion of this course, the students will be able to

1. Identify the different planning process involved in transportation and the importance of Zoning.
2. Demonstrate the ability to understand the various distribution methods, trip generation and critically apply the analysis techniques practically.
3. Understand the principles in traffic assignment and apply them suitably as a Successful transportation Engineer.
4. Demonstrate the ability to evaluate a transport projects critically in all aspects and apply transport planning process effectively for medium and small sized towns.

5. Understand the different evaluation techniques.

Text Books

1. Kadiyali.L.R. (2008), Traffic Engineering and Transportation Planning, Khanna Publishers, ISBN-9788174092205.
2. Ortuzar.J.D., and Willumsen. Luis G. (2011), Modelling Transport, Fourth Edition, John Wiley & Sons, ISBN-9781119993520.

Reference Books

1. Wright.P.H.,Ashford.N., and Stammer.R., (1998), Transportation Engineering – Planning & Design, Fourth Edition, John Wiley & Sons, New York, ISBN-9780471173960.
2. Dickey.J.W., (1995), Metropolitan Transportation Planning, Tata McGraw-Hill publishing company Ltd, New Delhi.
3. Papacostas.C.S., and Prevedouros.P.D., (2001) "Transportation Engineering and Planning", Indian Edition, Prentice-Hall of India , ISBN-9788120321540.
4. Garber. Nicholas J., and Hoel. Lester A., (2009), Traffic & Highway Engineering, Fourth Edition, Cengage Learning, ISBN-9780495082507

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

SEMESTER VII

Professional Elective Course-IV (PEC-IV)

Course Title: Solid and Hazardous Management **Max. Marks: 100**
Course Code: PEC-CE-774 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits: 3[2-1-0)

Course Objective: The course on Solid Waste Management gives the student an overview of municipal solid waste management including collection, transfer, transport, and disposal. Methods of processing, basic disposal facilities, disposal options, and the environmental issues of solid waste management will be covered in this course. In addition, this course provides the student with relevant information about municipal solid waste reduction and on hazardous waste management

Unit-I

Sources and Composition of Municipal Solid Waste: Introduction, Sources of solid waste, Types of solid waste, Composition of solid waste and its determination, Types of materials recovered from MSW.

Unit-II

Properties of Municipal Solid Waste: Physical properties of Municipal Solid Waste, Chemical properties of Municipal Solid Waste, Biological properties of Municipal Solid Waste, Transformation of Municipal Solid Waste. Hazardous waste- Risk assessment, Environmental legislation, Characterization and site assessment, Waste minimization and resource recovery, Transportation of hazardous waste, Characteristics Hazardous waste toxicity, reactivity, infectiousness, flammability, radioactivity, corrosiveness, irritation, bio-concentration, genetic activity, explosiveness.

Unit-III

Solid Waste Generation and Collection: Quantities of Solid Waste, Measurements and methods to measure solid waste quantities, Integrated Solid Waste Management System: Collection, Storage, Segregation, Reuse and Recycling possibilities, Transportation, Treatment / Processing and Transformation Techniques, Final Disposal, Factors affecting solid waste generation rate, Quantities of materials recovered from MSW.

Unit- IV

Handling, Separation and Storage of Solid Waste: Handling and separation of solid waste at site, Material separation by pick in, screens, float and separator magnets and electromechanical separator and other latest devices for material separation, Waste handling and separation at Commercial and industrial facilities, Storage of solid waste at the sources.

Unit-V

Processing of Solid Waste: Processing of solid waste at residence e.g. Storage, conveying, compacting, Shredding, pulping, granulating etc., Processing of solid waste at Commercial and industrial site, Facility

Development and operation, Site Remediation: Quantitative risk assessment, site and subsurface characterization, Containment, remedial alternatives.

Course Outcome: The student will be able to:

1. Explain the types, quantity, nature of solid waste generated in a town
2. Estimate the composition and characterization of solid waste
3. Devise strategic planning for the collection of solid waste, mode of transport, site selection criteria, and techniques for safe disposal of solid without harming natural attributes.
4. Explain the modern and scientific methods to dispose solid waste with due concern to environmental issues.
5. Explore the possibilities of reuse, recycling and recovery of materials from the solid waste.

Textbooks :

1. Vesilind, P.A., Worrell, W., and Reinhart, D., "Solid Waste Engineering", Brooks/Cole, 2002.
2. LaGrega, M, Buckingham, P. and Evants, J.C., “Hazardous Waste Management”. McGraw-Hill, New York, 2001.

Reference books:

1. Tchobanoglous, G., Theisen, H and Vigil, S., “Integrated Solid Waste Management”, McGrawHill, New York, 1993.
2. Pfeffer, J.T., "Solid Waste Management Engineering", Prentice Hall, 1992.
3. Wentz, C., “Hazardous Waste Management”. McGraw-Hill, New York, 1995.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit

SEMESTER-VII

List of courses in Open Elective Course-III

Course Title: Optical Communication **Max Marks: 100**
Course Code: OEC-CE-781/PEC-ECE-727 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3[3-0-0)

Objective: The course has been designed for explaining the basic concepts and principles of Optical Communication to the students. Applied and Industrial Aspects of optical communication have been taken care of in an appropriate manner.

Unit–I

Overview of Optical Fiber Communication: Brief Overview of Optical Communication, Basic concepts, light wave components, principle of light transmission, channel capacity etc. Nature of light, polarization, basic laws and definition, mode theory analysis for optical communication, optical fiber modes and configuration, wave propagation in optical fiber, operating wavelength, single mode and multimode fibers, V–numbers, mode field diameter, numerical aperture, refractive index profiles.

Unit–II

Signal Degradation in Optical Fibers: Attenuation, absorption, scattering losses, bending losses in optical fibers. Dispersion in optical waveguides, group delay, material dispersion, waveguide dispersion, intermodal dispersion and chromatic dispersion in single mode fibers, Non linearities in Fibers

Unit–III

Optical Sources: Basic concepts from semiconductor electronics, energy bands, Concept of Direct and indirect Band Devices. Light emitting diodes: Structure, principle, material, modulation response, transient response. Laser diodes: Principle of action, structure, efficiency and characteristics of laser diodes, modulation He–Ne lasers, DFB lasers.

Unit-IV

Optical Detectors: Basic Information in light detectors, Role of an optical detector, Detector Characteristics: Responsivity, Noise Equivalent Power, Detectivity, Quantum efficiency, Detector response time, Linearity, Spectral response, Noise Considerations, The PN junction photo diode – PIN photodetectors – Avalanche photo diode construction characteristics and properties, APD Specifications, simple model of photo receiver – its equivalent for SNR, Optical Receivers.

Unit–V

Transmission Systems and Advanced Multiplexing Strategies: Power Launching and coupling. Point to point link system consideration, Optical TDM, subscriber multiplexing (SCM), WDM and Hybrid multiplexing methods, Optical amplifiers - EDFA

Course Outcomes:

After completion of the course student will be able to:

1. Recognize and classify the structures of Optical fiber networks and their types.
2. Discuss the channel impediments like losses, interference and dispersion.
3. Describe the Optical sources and detectors and thus able to illustrate their working principle.
4. Familiar with Design considerations of fiber optic systems.
5. Perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyse the results to provide valid conclusions.

Text Books:

1. **John M Senior -**Optical Comm Techniques –PHI
2. **Keiser G-** Optical Fiber Communication, 3rd Edition, Mc Graw Hill International
3. **Mynbacv D.F. and Scheine L -**Fiber Optic Communication Technique, Pearson.

Reference Books:

1. **Ghatak & Thyangarajan K**- Introduction to fiber optics, Cambridge university press,1998.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit

Semester-VII

List of courses in Open Elective Course-III

Course Title: Digital Logic Design **Max Marks: 100**
Course Code: OEC-CE-782/PCC-CSE-325 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3[3-0-0)

Course Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit -I

Introduction, Binary numbers, Base-conversions, Octal and hexadecimal numbers, Binary codes, Concept of fixed and floating point numbers, Complement Number Representation, Addition, Subtraction, Multiplication, and Division. Review of Boolean algebra, De-Morgan's Theorems, Boolean functions and representation in canonical and standard forms, SOP and POS forms.

Unit -II

Digital Logic Gates,IC Digital Logic Families, Karnaugh Map Method: 3 variable , 4 variable, 5 variable Map, limitations of K-maps for larger variables, POS-simplification, NAND/NOR implementation, other 2-level implementations, Don't-care conditions, Tabular method.

U nit-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

Unit -IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit -V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

Course Outcomes:
After studying this course the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

2. To understand and examine the structure of various number systems and its application in digital design.
3. Ability to identify basic requirements for a design application and propose a cost effective solution.
4. The ability to identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build, and troubleshoot digital circuits.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.

References Books:

3. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4thEdition 1997.
4. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.
5. **Gothman**, Fundamentals of Digital Electronics, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester VII

List of courses in Open Elective Course-III

Course Title: Java Programming **Max Marks: 100,**
Course Code: OEC-CE-783/PCC-CSE-523 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3[3-0-0)

OBJECTIVE: To enhance skills of student with the ever demanding programming language Core Java.

UNIT-I

Overview of Java: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Byte code, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

UNIT-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

UNIT-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

UNIT-IV

I/O, Applets and String Handing Files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, Print Writer Class, Reading and Writing Files, Transient And Volatile Modifiers, Instance Of, Strictfp, Native Methods. Applets: Introduction: Applet Fundamentals, Applet Architecture. Strings: String Constructors, String Operations, String Buffer, String Builder, Sting Tokenizer.

UNIT-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Course Outcomes:

1. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
2. Write Java application programs using OOP principles and proper program structuring.
3. Demonstrate the concepts of polymorphism and inheritance.
4. Write Java programs to implement error handling techniques using exception handling.

5. Use collections Framework to solve problems

TEXT BOOKS:

1.P. Naughton& H. Schildt, Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2.K. Arnold & J. Gosling, the Java Programming Language, 2nd Edn, Addison Wesley, 1996.

REFERENCE BOOKS:

Cay S. Horstmann, Gary Cornell, Core Java 2 Volume I Fundamentals, 5th Edn. PHI, 4000.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

SEMESTER-VII

List of courses in Open Elective Course-III

Course Title: Data Warehousing and Data Mining **Max Marks: 100**
Course Code: OEC-CE-784/PEC-CSE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3[3-0-0)

Course Objective:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply pre-processing methods on raw data.
3. Learning different classification algorithms for data mining.

Unit-I

Introduction: Sources, Users, Applications and Goals of a Data Warehouse, Components of a Data Warehouse, Operational Data Store, Dimensional Modeling: Fact and Dimension Tables, Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions, Helper Tables and Surrogate Keys.

Unit-II

Data Warehouse: Characteristics of a Data Warehouse, Software Architecture and Design, Data Granularity Model, Data Warehouse Bus Architecture. Meta Data: Need and Types of Metadata, Metadata Process Concept. Data Marts and its Characteristics, Comparison between OLTP and OLAP.

Unit-III

Decision Support System (DSS): Using Data Warehouse for DSS, Techniques and Solutions for constructing a Central Data Warehouse, Data Extraction, Cleanup, and Transformation Tools, Managing a Data Warehouse Environment.

Unit-IV

Data Mining: Introduction to Data Mining and Uses, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining Task Primitives.

Association Rules: Association rules mining, Mining Association rules from single level, multilevel transaction databases, multidimensional relational databases and data warehouses, Co-relational analysis, Constraint based association mining.

Unit-V

Classification and Clustering: Classification and prediction, decision tree induction, Bayesian classification, k-nearest neighbor classification, rule based classification, classification of back propagation, support vector machines, associative classification, cluster analysis, types of data in clustering, categorization of clustering methods, genetic algorithms and data visualization concepts.

Course Outcomes

Students who complete this course should be able to

1. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
2. Describe the various architectures and main components of a data warehouse.
3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
4. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
5. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. **Gray & Smith**, Data Warehousing handbook, CRS, PHI.
2. **Berson**, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. **Mallach**, Data Warehousing, Data Warehousing System, McGraw Hill.
2. Concepts, Techniques, Products and Applications, 2_{nd}Edn, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

SEMESTER-VII
List of courses in Open Elective Course-III

Course Title: Electrical Engineering Materias **Max Marks: 100**
Course Code: OEC-CE-785/PCC-EE-324 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3[3-0-0)

Course Objective: The course has been designed to get student acquainted with the properties of various engineering materials and their applications in Engineering Sciences.

Unit-I
Crystal Structure of Solids: Atomic packing, crystal lattice, Different type of crystal Bands, structure of silicon & Germanium, Energy Bands in solids, one dimensional lattice, Electron in periodic potential, concept of hole, Three dimensional Lattice and Brullioun Zones Elastic Wave and Photons (Elementary Ideas).

Unit-II
Insulating Materials: Introduction to Insulators, dielectric behavior, Properties of Insulating Materials, Insulators in Static & Alternating fields, classification as per temperature rise, Practical Dielectrics, Liquid: Solid and Gaseous and their applications.

Unit-III
Dielectric Materials: Polarization, Quantitative and qualitative discussion of dielectric constants of polyatomic molecules, Internal fields in solids and Liquids. Ferroelectrics & Piezoelectric Materials, spontaneous polarization, Frequency dependence of polarizabilities, complex dielectric constant of non-dipolar solids, Dipolar relaxation, dielectric losses, Dielectric Break downs.

Unit-IV
Magnetic Materials: Review of magnetic field concepts, Orbital dipole, and angular momentum of simple atomic models, classification of magnetic materials, spontaneous magnetism, Curie- Weiss Law, coercive forces; antiferro magnetic materials, ferromagnetic materials, Properties & applications of ferrites.

Unit-V
Conductivity of Metals: Ohm's Law, Relaxation time, collision time and mean free path, resistivity of conductors, temperature dependence of resistivity, super conductivity.
Semiconductor Materials: classifying materials as semiconductors, chemical bond in Si and Ge & its consequences, density of carriers in intrinsic semiconductors, the energy gap, the conductivity of intrinsic semiconductors, Carrier densities in n-type semiconductors & p-type semi-conductors, Hall Effect and Carrier Density.

Course Outcomes
1. Given a type of material, the students will be able to qualitatively describe the bonding scheme and its general physical properties, as well as possible applications in electrical engineering.
2. This will be helpful for the students to understand about the insulating properties of the materials.
3. This will be helpful for the students to understand about the Dielectric properties of the materials.

4. Students will be able to do comparative analysis of magnetic materials based upon their properties.
5. Students will be able to differentiate among various materials such as conductor and semiconductor based upon the internal composition and conductivities.

Text Books/References

1. **Dekker**, Electrical Engineering Materials.
2. **Allison**, Materials & Electronics Engineering & Devices.
3. **Raghvan**, Electrical Engineering Materials.
4. **S.P. Seth and P. V. Gupta**, Electrical Engineering Materials.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Semester–VIII

Course Title: Major Project-II **Max. Marks: 450**
Course Code: PROJ-CE-821 **University Examination: 200**
Duration of Exams: 3 hours **Internal Assessment: 250**
Credits 9 (0-0-0)

During semester VIII every student shall be allotted a Major Project-II in continuation to Project-I to his/her stream under the supervision of an allotted mentor. Students are required to report in their respective departments to do Final exercise of and submitted a hard copy report to department. Major Project-II should be under the supervision of an allotted mentor. Students are required to complete the Major Project-II during semester VIII. Major Project-II shall be evaluated internally as per university statutes by a committee consisting of:

i) Head of Department
ii) One member nominated by principal
iii) Coordinator(s)/Supervisor(s) of major project/training

Semester-VIII

Professional Elective Course-V (PEC-V)

Course Title: Advance Structural Design **Max. Marks: 100**
Course Code: PEC-CE-861 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: This course aims to strengthen the design skills in foundations, R Walls, domes and Pre stressed structures.

UNIT-I

Foundations: Various types of RCC footings, Design of isolated and combined footings. Introduction to Raft foundation.

UNIT-II

Retaining Walls: Stability analysis of retaining walls, design of cantilever and counter for type RCC retaining walls.

UNIT-III

Water Retaining Structures: Design of underground, circular and rectangular water tanks-reference to IS:3370

UNIT-IV

Shell Structures: Membrane analysis of spherical and conical domes by statical methods. Design of domes and ring beams.

UNIT-V

Pre Stressed Concrete: General principles, Methods of pre stressing, pre-tensioning and post-tensioning, losses in pre-stress. Design of rectangular, T and I section beams.

Course Outcomes: After studying the course student will:

1. Able to design the isolated and combined footing.
2. Able to design the retaining walls and analyse them for stability.
3. Capable of designing the different water tanks.
4. Able to do the membrane analysis of domes and design them.
5. Understand the methods of pre-stressing and able to calculate losses in pre-stress member.

Text Books:

1. **Bowels,** Foundation Engineering.
2. **Jain & Jaikrishen,** Design of R.C.C Structures Vol.-II.
3. **Krishnarayan,** Prestress Concrete Structures.

Books Recommended:

1. **Kong & Evans,** Design of reinforced and pre stressed concrete Structures.
2. **A.K. Jain,** Design of R.C.C.-Limit state Method.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Professional Elective Course-V (PEC-V)

Course Title: Earthquake Engineering **Max. Marks: 100**
Course Code: PEC-CE-862 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Objectives: The objective of this subject is to study how to design different types of earth quake resistant building.

Unit I

Theory of Vibrations: Difference between static loading and dynamic loading – Degree of freedom – idealisation of structure as single degree of freedom system – Formulation of Equations of motion of SDOF system – D'Alemberts principles – effect of damping – free and forced vibration of damped and undamped structures – Response to harmonic and periodic forces.

Unit II

Multiple Degree of Freedom System: Two degree of freedom system – modes of vibrations – formulation of equations of motion of multi degree of freedom (MDOF) system – Eigen values and Eigen vectors – Response to free and forced vibrations – damped and un-damped MDOF system – Modal superposition methods.

Unit III

Elements of Seismology: Elements of Engineering Seismology – Causes of Earthquake – Plate Tectonic theory – Elastic rebound Theory – Characteristic of earthquake – Estimation of earthquake parameters – Magnitude and intensity of earthquakes – Spectral Acceleration-Information on some disastrous earthquakes, Response of Structures to Earthquake, Response and design spectra - Design earthquake concept of peak acceleration - Site specific response spectrum - Effect of soil properties and damping.

Unit IV

Liquefaction of soils: Introduction, Theory of liquefaction, Liquefaction analysis, factor of safety against liquefaction, Evaluation of liquefaction potential, Remedial measures for liquefaction.

Unit V

Design Methodology: Causes of damage – Planning considerations / Architectural concepts as per IS:4326 – 1993 –Guidelines for Earthquake resistant design , Importance of ductility - Methods of introducing ductility into RC structures Design Methodology IS 1893, IS 13920 and IS 4326 - Codal provisions - Design as per the codes - Base isolation techniques - Vibration control measures – Important points in mitigating effects of earthquake on structures.

Course Outcomes: On completion of this course, the students will be able to

1. Understand SDOF system and MDOF system.
2. Know about the multiple degree of freedom of different systems.
3. Understand about the elements of seismology.
4. Understand the basics of liquefaction.
5. Understand the basic design codes.

Text Books

1. Chopra, A.K., "Dynamics of Structures – Theory and Applications to Earthquake Engineering", 4th Edition, Pearson Education, 2011.
2. Agarwal. P and Shrikhande. M., "Earthquake Resistant Design of Structures", Prentice Hall of India
Pvt. Ltd. 2007

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VIII

Professional Elective Course-V (PEC-V)

Course Title: Ground Water Hydrology **Max. Marks: 100**
Course Code: PEC-CE-863 **University Exam: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3(2-1-0)

Course Objective: Objective of this course is to introduce the students to the fundamentals of ground water flow, distribution of ground water, concept of aquifers, flow in confined and unconfined aquifers, interference among wells, well hydraulics, ground water development, ground water exploration by different techniques.

UNIT-I

Introduction: Darcy's Law, Hydraulic Head, Hydraulic conduction and permeability, Heterogeneity and Anisotropy of Hydraulic conductivity, porosity and void ratio, unsaturated flow and water table, Transmissibility and storability, specific storage, specific yield.

UNIT-II

Flow Nets: Flow nets by Graphical construction, Homogenous, Isotropic System, Flow nets by numerical simulation, potential steam function, Flow nets by Laplace's equation solution in inhomogeneous and anisotropic aquifers.

UNIT-III

Ground Water Occurrence: Steady- State Regional ground water flow, Recharge area, Discharge areas, Ground water divide, Effect of topography on regional flow, Effect of Geology on Regional Flow, Fluctuation in Ground water Table. Well hydraulics and well construction, geophysical explorations, groundwater quality and management of groundwater resources,

UNIT-IV

Ground Water Evaluation: Well yield, Aquifer yield and Basin yield, Explorations for aquifers, Surface and Subsurface investigations - Geologic methods; remote sensing; geophysical explorations; electrical resistivity and seismic refraction.

UNIT-V

Flow to Aquifers: Types of aquifers. Aquitard and Aquiclude, confined and unconfined aquifer, steady state flow and transient Flow, Equation of Ground water flow to aquifers, Radial flow. Their solution, Measurements of parameters pumping Tests, prediction of Aquifer yield by Numerical simulation, Finite difference method.

Course outcome: The student will be able to:

1. Explain the types and different parameters of aquifers, and permeability of aquifers.
2. Compute flow in aquifers and explain the salient features of various types of wells including the losses.
3. Derive the unsteady flow equation by various methods and obtain the solutions.

4. Explain the types and construction of wells, pumping tests in wells, working principles, and estimate power requirements of pumps and yield of wells.
5. Explain ground water recharge, ground water runoff, ground water budget, and harvesting techniques **Text Books:**

1. David Keith Todd, Ground water Hydrology.
2. W.Fetter, Printice Hall, Applied Hydrology.

Refrence Books:

1. Fletcher G.D, Ground water & Wells
2. Rastogi, Numerical Ground water Hydrology.
3. Bower H Ground Water Hydrology – 1978 McGraw Hill.
4. Garg,Satyaparakash Ground Water and Tube Wells, 1982 Oxford & IBH
5. Dr. P.N. Modi Irrigation Water Resources and Water Power – 2008 Standard book house Delhi. **Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

SEMESTER-VIII

Professional Elective Course-V (PEC-V)

Course Title: Architecture and Town Planning **Max. Marks: 100**

Course Code: PEC-CE-864 **University Examination: 60**

Duration of Exam: 3 Hrs **Internal Assessment: 40**

Credits 3(2-1-0)

Objectives: The objective of this subject is to study the principles of architecture design and functional planning of buildings. It also aims to realise the process of resource mobilization, organization of land-use, transportation and infrastructure networks both for efficient functioning and creation of pleasant and well ordered environment.

UNIT–I

Introduction to Architecture: Origin & definition, factors affecting Architecture, Aesthetics – Principles, Elements of Aesthetics point, Line, Plane, figure, form, shape, size, Background. Composition-focus, unity, balance, rhythm, harmony, discord, textures, contrast, scale, proportions and character. Colourpsychological impact and other fractures, Circulation.

UNIT–II

Basic Principles: Orientation of building, temperature, effect of sun and wind on orientation, climate- cool, temperate & arid season. Ventilation in buildings, space. Modern concept of building. Comfort, factors affecting planning. Vertical space and shelter, Landscape-architecture. Planning of Buildings – Aims, factors affecting, site selection.

UNIT–III

Town Planning: Introduction to town planning, evolution, objects, principles & importance of town planning. Origin & growth of towns, stages in town development, Planning of modern towns& military towns. Town planning in ancient India & present position. Zoning- Objects, Principles, importance and aspects.

UNIT–IV

Slums, Parks and Industries: Slums-Causes, Characteristics, effects, clearance, re-housing and prevention of slum formation. Parks- classification, park systems design, Park ways, Playgrounds, Industries-Classification, requirements and townships, Classification and principles of design of public buildings, objects of re-planning, garden city.

UNIT–V

Building Bye-laws and Regulation: Building bye-laws, underlying principles. Functions of local authority, applicability of bye-laws, set back, light plane, floor space off-street parking. Building bye-laws for residentional area of a town scheme. Master plan- objects, importance and features. Stages of preparation of development plan. Urban roads, street system and traffic management.

Couse Outcome:- After completion of course students will be able to

1. Know about the history of Architecture.
2. Understand the basic principle of Architecture.
3. Understand the different phases in town planning.
4. Know about the different settlements.
5. Acquire knowledge about the building by law and regulations.

Reference Books:

1. Satish Chandra Agarwala, Architecture &Town Planning, Dhanpat Rai & Co. 2.
Gurcharan Singh and Jagdish Singh, Building Planning and Scheduling,
3. Standard Publishers and Distributers.
4. Lewis Keeble, Town Planning Made Plain & town & country planning association;London, 1983
5. Rangwala,S.C.,Town Planning, Charotar Publishing House, Anand India.
6. Hiraqskar, G.K., Fundamentals of Town Planning, Dhanpat Rai & Sons., Delhi Curriculum & Syllabi (B.tech Civil Engineering)
7. Pickering, E., Architecture Design, John Wiley and Sons, London.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Semester–VIII

Professional Elective Course-VI (PEC-VI)

Course Title: Geographical Information System and Science **Max. Marks: 100**
Course Code: PEC-CE-865 **University Examination: 60**
Duration of Exam: 3 Hrs **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: Students will learn how to compile, analyze, and present geospatial data while emphasizing the value of visual communication. Students will learn these basic geospatial concepts while working with

ESRI's Arc GIS software.

Unit-I

Introduction: History and development of GIS, components of GIS, applications of GIS; Coordinate systems –datum's, latitudes, longitudes, Geographical Coordinate Systems, WGS84, Projected Coordinate System and UTM; Geospatial data.

Unit-II

Data Models

Data format: Raster and Vector data formats; Spatial Data Models –Vector and Raster data models, Non- Spatial Data Models, Topology models, Grid model, TIN model, Network model,

Unit-III

Data Sources and Data Entry

Data Sources-collection; capture and Geo-processing, input methods, editing, re-projection, geometric transformation, Digitizing, GPS, Remote Sensing, Attribute Data: Queries and Analysis; Spatial Data: Spatial Queries and Basic Spatial Analysis; Raster and Vector data Inputs

Unit-IV

Data Analysis

Vector Data Analysis tools - Data Analysis tools - Network Analysis - Digital Education models - 3D data collection and utilization.

Unit-V

GIS Modelling and analysis: Basic elements of GIS modeling; Coupling-Loose, Tight coupling; Spatial interpolation; Vector data analysis:-buffering, overlay; Raster data analysis–local operations, neighborhood operations, zonal operations; Terrain mapping and analysis-DEM and TIN.

Course Outcome:- After completion of course student Will be able to

1. Describe what geography and GIS are;
2. Understand the importance of scale, projection, and coordinate systems in GIS;
3. Understand vector and raster data structures and the appropriate use of each of these data structures;
4. Understand the basics of data capture, storage, analysis, and output in a GIS; and
5. Understand typical uses of GIS in business, government, and resource management.

Text Books:

1.A First Text on Geographic Information Systems (2nd edition), by Paul Bolstad,published by Eider Press.

References Books:

1.*ArcGIS Desktop*(2nd edition), by Tim Ormsby et al., published by Environmental Systems Research Inc. (ESRI)

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester–VIII

Professional Elective Course-VI (PEC-VI)

Course Title: Structural Geology **Max. Marks: 100**
Course Code: PEC-CE-866 **University Examination: 60**
Duration of Exam: 3 Hrs **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The objective is to teach material on structural geology critical to practicing geologic professionals, including recognition of structural features, and an enhanced understanding of earth dynamics and mechanics.

Unit-I Introduction: Description, classification, and origin of earth structures.

Unit-II

Crust: Different ways in which the continental crust can deform; link scales of structure from the field, outcrops, hand specimen, thin section by integrating analytical techniques with practical examples.

Unit-III

2D strain &3D strain: Theoretical and meso to microscale analysis of structures developed through a linked series of lectures and practicals; practical 2D strain analysis; 3D strain concepts; incremental strain, kinematics and polyphase deformations.

Unit-IV

Fold and Fault Techniques and Plate Tectonics: - fold construction and classes; fault evolution and section balancing; fault rock microstructures; fault and fold mechanics, current concepts in plate tectonics, cross-section construction techniques.

Unit-V

Tectonic Settings and structural Geology for reservior:- structural interpretation of seismic data, structural styles in different tectonic settings (thrust and fold belts, rifts, strike and slip, gravity tectonics, inversion), structural geology of reservoir units

Course Outcome: Students will be able to

1. Acquire knowledge on the geometry and type of structures present in earth.
2. Understand and describe the features formed in rocks when subjected to stress.
3. Understand the impact of structural geology to active tectonic settings
4. Understand micro and macro scale deformation mechanisms (viz., brittle, ductile).
5. Portray 2D and 3D strain analysis for various deformation behaviours.

Text Books:

1.Twiss, Robert J., and Eldridge M. Moores. *Structural Geology*. New York, NY: W. H. Freeman, 1992. ISBN: 9780716722526.

References Books:

1.Ghosh, S.K., Structural Geology: Fundamentals and Modern Developments, Elsevier

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

SEMESTER–VIII

Professional Elective Course-VI (PEC-VI)

Course Title: Water Resources Field Methods **Max. Marks: 100**
Course Code: PEC-CE-867 **University Examination: 60**
Duration of Exam: 3 Hrs **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: The objective of this course is to identifying and evaluating multiple-purpose, multi-objective water quantity and quality planning and management issues.

Unit-I

Introduction: Scientific principles of measurement technologies and protocols used for water-resources measurements.

Unit-II

Design Studies:-Experimental design of field-scale water-resources and environmental studies

Unit-III

Planning field studies:- Planning field studies related to instruments and protocols for surface-water, ground-water, and water-quality sampling.

Unit-IV

Data Quality and different monitoring Systems (Part-I):-Description of data quality and One-half-day laboratory field trips to stream flow monitoring stations and

Unit-V

Data Quality and different monitoring Systems (Part-II):-Groundwater monitoring wells related systems.

Course Outcomes: Students will be able to

1. Use the various optimization methods for future water demand allocation under different scenarios.
2. Efficient water use to satisfy rising water demands using optimization techniques can be inherently applied by
3. Students for any irrigation, industrial cluster, municipal or watershed water distribution project.
4. Real life field application challenges like reservoir water allocation for different activities like irrigation, bio diversity maintenance, and environmental flows can be addressed with knowledge of optimization methods.
5. Students will be skilled so that they assess and evaluate water demand in such a way that all water resources

Text Books:

1. Water Resource Systems Planning and Management Authors: **Loucks**, Daniel P., **van** Beek,

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester–VIII

Professional Elective Course-VI (PEC-VI)

Course Title: Environmental Impact Assessment **Max. Marks: 100**
Course Code: PEC-CE-868 **University Examination: 60**
Duration of Exam: 3 Hrs **Internal Assessment: 40**
Credits 3(2-1-0)

Objective: This course introduces the methodology of environmental impact assessment (EIA) as a vital tool for sound environmental management and decision-making. The course provides an overview of the concepts, methods, issues and various forms and stages of the EIA process.

UNIT-I

Environmental assessment: Evolution of environmental impact assessment (EIA), EIA at project, regional and policy level; strategic EIA, EIA process, screening and scoping criteria, rapid and comprehensive EIA, specialized areas like environmental health impact assessment, environmental risk analysis, economic valuation methods, cost benefit analysis, expert system and GIS applications, uncertainties.

UNIT-II

Environmental policies and legislation: Legislative and environmental clearance procedures in India and other countries, sitting criteria, public participation, resettlement and rehabilitation.

UNIT-III

Methodologies: Practical applications of EIA, EIA methodologies, baseline data collection, prediction and assessment of impacts on physical, biological and socio-economic environment, environmental management plan, post project monitoring, EIA report and EIS, review process.

UNIT-IV

Environmental systems Modelling: Principles of modelling, classification; introduction to air quality models, meteorology, atmospheric stability and turbulence, Gaussian plume model and modification, numerical models.

UNIT-V

Transport and fate of pollutant in aquatic system: introduction to river, estuarine and lake hydrodynamics, stratification and eutrophication of lakes, dissolved oxygen model for streams.

Course Outcome:-Students will be able to

1. Explain the major principles of environmental impact assessment in Australia
2. Understand the different steps within environmental impact assessment
3. Discuss the implications of current jurisdictional and institutional arrangements in relation to environmental impact assessment
4. Communicate both orally and in written form the key aspects of environmental impact assessment
5. Understand how to liaise with and the importance of stakeholders in the EIA process

Text Books

1. Environmental Impact Assessment for Developing Countries: Asit K. Biswas
2. Environmental Impact Analysis Handbook: G.J. Rau and C.D. Wooten
3. Environmental Impact Assessment: L. Canter

Reference Books

1. Air Pollution: J.H. Seinfield
2. Principles of Surface Water Quality Modelling and Control : R.V. Thomann and J. A. Muller

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Baba Ghulam Shah Badshah University
Rajouri (J&K)-185243

Syllabus First to Eighth Semester
B.Tech. ECE Degree Course
(2022-2026)

Department of Electronics and Communication Engineering
School of Engineering and Technology

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Curriculum Structure
(2022 – 2026)

Assessment Procedure

For each theory course the total weightage is 100 marks and the assessment pattern is shown in table 1. For laboratory courses the total weightage is 50 marks and the assessment pattern is shown in table 2.

Continuous Assessment		University Examination	
Component	**Weightage**	**Component**	**Weightage**
Cyclic Test 1	10	Written Examination	60
Cyclic Test 2	10		
Assignment 1	05		
Assignment 2	05		
Attendance	10		
Total	**40**		**60**

Table 1: Distribution of weightage for theory courses.

Continuous Assessment		University Examination	
Component	**Weightage**	**Component**	**Weightage**
Continuous assessment of practical work, timely submission of lab records.	15	Lab experiment / procedure/ writing/ tabulation/ innovation as applicable	20
Test	05		
Attendance	05	Viva Voce	05
Total	**25**		**25**

Table 2: Distribution of weightage for laboratory courses.

Semester-I

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA*	UE*	Total Marks	L*	T*	P*	
BSC-ECE-121	Mathematics-I	3	40	60	100	3	1	0	4
ESC-ECE-121	Basic Electrical Engineering	3	40	60	100	3	1	0	4
HSMC-ECE-121	Communication Skills	3	40	60	100	2	0	0	2
ESC-ECE-122	Engineering Mechanics	3	40	60	100	3	1	0	3
ESC-ECE-123	Computer Fundamentals	3	40	60	100	3	1	0	4
MC-ECE-121	Indian Constitution**	3	40	60	100	2	0	0	0
Total (Theory)			**200**	**300**	**500**				
Laboratory Courses									
ESC-ECE-131	Basic Electrical Engineering Lab	2	25	25	50	0	0	2	1
HSMC-ECE-131	Communication Skills Lab	2	25	25	50	0	0	2	1
ESC-ECE-132	Engineering Mechanics Lab	2	25	25	50	0	0	2	1
ESC-ECE-133	Computer Fundamentals Lab	2	25	25	50	0	0	2	1
ESC-ECE-134	Workshop Practice	2	50	-	50	0	0	2	2
MC-ECE-131	Induction Program**	-	-	-	-	-	-	-	0
Total (Lab)			**150**	**100**	**250**				
Total (Theory + Lab)			**350**	**400**	**750**	**Total Credits**			**23**

Semester-II

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA*	UE*	Total Marks	L*	T*	P*	
BSC-ECE-221	Mathematics-II	3	40	60	100	3	1	0	4
ESC-ECE-221	Basic Electronics	3	40	60	100	3	1	0	4
BSC-ECE-222	Engineering Physics	3	40	60	100	3	1	0	4
BSC-ECE-223	Engineering Chemistry	3	40	60	100	3	1	0	4
ESC-ECE-222	C-Programming	3	40	60	100	2	1	0	3
MC-ECE-221	Environmental Science**	3	40	60	100	2	0	0	0
Total (Theory)			**200**	**300**	**500**				
Laboratory Courses									
ESC-ECE-231	Basic Electronics Lab	2	25	25	50	0	0	2	1
BSC-ECE-231	Engineering Physics Lab	2	25	25	50	0	0	2	1
BSC-ECE-232	Engineering Chemistry Lab	2	25	25	50	0	0	2	1
ESC-ECE-232	C-Programming Lab	2	25	25	50	0	0	2	1
ESC-ECE-233	Engineering Graphics Lab***	3	40	60	100	1	0	2	3
Total (Lab)			140	160	300				
Total (Theory + Lab)			**300**	**500**	**800**	**Total Credits**			**26**

* IA: Internal Assessment; UE: University Examination; L: Lecture; T: Tutorial; P: Practical

** In Non-Credit courses, the student has to get at-least minimum pass marks to qualify the subject. Non Credit Course marks aren't included in total marks. The student has to qualify induction program course by attending the training which will be verified by concerned teacher.

*** The examination pattern of engineering graphics shall be same as of other theory courses.

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Semester-III

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA*	UE*	Total Marks	L*	T*	P*	
BSC-ECE-321	Mathematics-III	3	40	60	100	3	1	0	4
PCC-ECE-321	Network Analysis & Synthesis	3	40	60	100	3	0	0	3
PCC-ECE-322	Advanced Electronic Circuit	3	40	60	100	3	1	0	4
PCC-ECE-323	Solid State Electronic Devices	3	40	60	100	3	1	0	3
PCC-ECE-324	Digital Electronics	3	40	60	100	3	1	0	4
PCC-ECE-325	Electronic Measurements and Instrumentation	3	40	60	100	3	0	0	3
Total (Theory)			240	360	600				
Laboratory Courses									
PCC-ECE-331	Advanced Electronic Circuits Lab	2	25	25	50	0	0	2	1
PCC-ECE-332	Digital Electronics Lab	2	25	25	50	0	0	2	1
PCC-ECE-333	Network Analysis Lab	2	25	25	50	0	0	2	1
Total (Lab)			75	75	150				
Total (Theory + Lab)			315	435	750	Total Credits			25

Semester-IV

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA	UE	Total Marks	L	T	P	
BSC-ECE-421	Numerical Techniques	3	40	60	100	3	1	0	4
PCC-ECE-421	Signals & Systems	3	40	60	100	3	0	0	3
PCC-ECE-422	Linear Control Systems	3	40	60	100	3	0	0	3
PCC-ECE-423	Analog Communication Systems	3	40	60	100	3	1	0	4
PCC-ECE-424	Linear Integrated Circuits & Pulse Switching	3	40	60	100	3	1	0	4
PCC-ECE-425	Data Communication and Computer Networks	3	40	60	100	3	0	0	3
Total (Theory)			**240**	**360**	**600**				
Laboratory Courses									
PCC-ECE-431	Signal and system Lab	2	25	25	50	0	0	2	1
PCC-ECE-432	Analog Communication Systems Lab	2	25	25	50	0	0	2	1
PCC-ECE-433	Linear Integrated Circuits Lab	2	25	25	50	0	0	2	1
Total (Lab)			75	75	150				
Total (Theory + Lab)			315	435	750	Total Credits			24

* IA: Internal Assessment; UE: University Examination; L: Lecture; T: Tutorial; P: Practical

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Semester-V

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA*	UE*	Total Marks	L*	T*	P*	
PCC-ECE-521	Microprocessor & Interfacing	3	40	60	100	3	0	0	3
PCC-ECE-522	Digital Communication Systems	3	40	60	100	3	0	0	3
PCC-ECE-523	EM Wave Theory	3	40	60	100	3	0	0	3
PCC-ECE-524	Computer Organization and Architecture	3	40	60	100	3	0	0	3
PEC-ECE-52X	Professional Elective I	3	40	60	100	3	0	0	3
OEC-XXX-XXX	Open Elective – I	3	40	60	100	3	0	0	3
Total (Theory)			**240**	**360**	**600**				
Laboratory Courses									
PCC-ECE-531	Microprocessor & Interfacing Lab	2	25	25	50	0	0	2	1
PCC-ECE-532	Digital Communication System Lab	2	25	25	50	0	0	2	1
PCC-ECE-533	PCB and Project Lab	2	25	25	50	0	0	2	1
PROJ-ECE-531	Industrial Training – I & Seminar	-	25	-	25	-	-	-	1
Total (Lab)			**100**	**75**	**175**				
Total (Theory + Lab)			**365**	**435**	**775**	**Total Credits**			**22**

Semester-VI

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA	UE	Total Marks	L	T	P	
PCC-ECE-621	Digital Signal Processing	3	40	60	100	3	1	0	4
PCC-ECE-622	Micro-Controller and Embedded Systems	3	40	60	100	3	0	0	3
PCC-ECE-623	Antenna and Wave Propagation	3	40	60	100	3	0	0	3
PEC-ECE-62X	Professional Elective – II	3	40	60	100	3	0	0	3
PEC-ECE-62X	Professional Elective – III	3	40	60	100	3	0	0	3
OEC-XXX-XXX	Open Elective – II	3	40	60	100	3	0	0	3
Total (Theory)			**240**	**360**	**600**				
Laboratory Courses									
PCC-ECE-631	Digital Signal Processing Lab	2	25	25	50	0	0	2	1
PCC-ECE-632	Micro-Controller and Embedded Systems Lab	2	25	25	50	0	0	2	1
PCC-ECE-633	Antenna Lab	2	25	25	50	0	0	2	1
OEC-ECE-63X	Open Elective – II Lab	2	25	25	50	0	0	2	1
Total (Lab)			**100**	**100**	**150**				
Total (Theory + Lab)			**340**	**460**	**800**	**Total Credits**			**23**

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Semester-VII

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA*	UE*	Total Marks	L*	T*	P*	
PCC-ECE-721	RF and Microwave Engineering	3	40	60	100	3	0	0	3
PEC-ECE-72X	Professional Elective – IV	3	40	60	100	3	0	0	3
PEC-ECE-72X	Professional Elective – V	3	40	60	100	3	0	0	3
HSMC-ECE-721	Entrepreneurship Development & Management								
OEC-XXX-72X	Open Elective-III	3	40	60	100	3	0	0	3
PROJ-ECE-721	Major Project Phase – I	-	100	0	100	0	0	3	3
Total (Theory)			**240**	**360**	**600**				
Laboratory Courses									
PCC-ECE-731	Microwave Engineering Lab	2	25	25	50	0	0	2	1
PEC-ECE-73X	Professional Elective – V Lab	2	25	25	50	0	0	2	1
PROJ-ECE-731	Industrial Training-II & Seminar	-	25	-	50	-	-	-	1
Total (Lab)			**75**	**50**	**125**				
Total (Theory + Lab)			**315**	**410**	**725**	**Total Credits**			**21**

Semester-VIII

Theory Courses									
Course Code	Title	Scheme of Examination				Hrs./Week			Credits
		Duration (hrs.)	IA	UE	Total Marks	L	T	P	
PROJ-ECE-821	Major Project Phase – II	-	250	200	450	0	0	9	9
PEC-ECE-82X	Professional Elective – VI	3	40	60	100	3	0	0	3
OEC-XXX-XXX	Open Elective - IV	3	40	60	100	3	0	0	3
Total (Theory)			**330**	**320**	**650**	**Total Credits**			**15**

At the end of semesters IV and VI students are required to attend an Industrial Training for 6 weeks, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Trainings shall be an essential component of curriculum to fulfil the eligibility criteria for appearing in semesters V and VII university examinations. The examination of Industrial Trainings shall be conducted during semester V and VII examinations.

After the university examination of semester VI every student shall be allotted a Major Project pertaining to his/her area of interest under the supervision of an allotted mentor. Students are required to report to their respective mentors to do preliminary exercise of survey of literature and preparation of a road map of the selected Major project. Students are required to complete the phase I of Major project work during semester VII and phase II in Semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the student shall be offered in-house project in campus or they can complete their project work in any organization/Industry outside the campus. Major Project shall be evaluated externally through the quality of work carried out, the report submission content and presentation.

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Professional Elective Courses

The choice of electives will rest with the students. However, in no case will the department run more than two subjects for one elective paper.

Professional Elective Courses	Course Code	Course Title
I	PEC-ECE-521	Industrial Electronics
	PEC-ECE-522	Electronic Multimedia Engineering
	PEC-ECE-523	Smart Material Systems & MEMS
	PEC-ECE-524	Engineering Material Science
	PEC-ECE-525	VLSI Design
II	PEC-ECE-621	Mobile and Wireless Communication
	PEC-ECE-622	Satellite Communication
	PEC-ECE-623	Electrical Machines
	PEC-ECE-624	Digital System Design
III	PEC-ECE-625	RF IC Design
	PEC-ECE-626	Optoelectronic Devices
	PEC-ECE-627	Non-Conventional Energy Sources
	PEC-ECE-628/PCC-EE-621	Power Electronics
IV	PEC-ECE-721	Random Process and Information Theory
	PEC-ECE-722	Advanced 3G and 4G Wireless & Mobile Communication
	PEC-ECE-723	Analog and Mixed Signal Design
	PEC-ECE-724	Device Modelling for Circuit Simulations
V	1.	PEC-ECE-725 Biomedical Instrumentation
		PEC-ECE-731 Biomedical Instrumentation Lab
	2.	PEC-ECE-726 Radar Engineering
		PEC-ECE-732 Radar Engineering Lab
	3.	PEC-ECE-727 Optical Communication
		PEC-ECE-733 Optical Communication Lab
VI	PEC-ECE-821	Adaptive Signal Processing
	PEC-ECE-822	Digital Image Processing

	PEC-ECE-823	Nanotechnology
	PEC-ECE-824	Optical Networks

Open Elective Courses

Courses that other departments will offer. The choice of electives will rest with the students.

Open Elective Courses	Course Code		Course Title
I	OEC-ECE-521/PCC-CSE-322		Object Oriented Programming using C++
	OEC-ECE-522/PCC-ITE-524		Java Programming
	OEC-ECE-523/PCC-EE-521		Power System – I
	OEC-ECE-524/PCC-CE-522		Environmental Engineering
	OEC-ECE-525/PEC-CSE-725		Natural Language Processing
II	1.	OEC-ECE-621/PCC-CSE-422	Python Programming
		OEC-ECE-431/PCC-CSE-431	Python Programming Lab
	2.	OEC-ECE-622/PCC-EE-421	Renewable Energy Sources
		OEC-ECE-432/PCC-EE-432	Renewable Energy Sources Lab
	3.	OEC-ECE-623/ PCC-CSE-422	Unix /Linux and Shell Programming
		OEC-ECE-433/PCC-CSE-433	Unix /Linux and Shell Programming Lab
III	OEC-ECE-721/PCC-CSE-722		Artificial Intelligence
	OEC-ECE-723/PCC-ITE-522		Internet and Web Technologies
	OEC-ECE-724/PCC-CE-325		Disaster Preparedness and Planning
	OEC-ECE-725/PEC-CSE-722		Internet of Things
IV	OEC-ECE-821/PEC-CSE-826		Neural Networks
	OEC-ECE-822/PEC-EE-622		Energy Audit and Management
	OEC-ECE-823/PEC-CE-628		Industrial Waste Treatment
	OEC-ECE-824/PEC-ITE-625		Data Mining and Warehousing
	OEC-ECE-825/PEC-CSE-621		Machine Learning
	OEC-ECE-826/PEC-CSE-828		Bio-Informatics
	OEC-ECE-827/PEC-CSE-621		Wireless Network

Semester – I

Semester I

Course Title: Mathematics-I **Max. Marks:100**
Course Code: BSC-ECE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The course is designed to impart elementary knowledge of theory of calculus, linear algebra and sequence & series to engineering students that will serve them to solve various engineering problems.

Unit-I

Differential Calculus: Rolle's Theorem, Mean value theorems, indeterminate forms and L'Hospital's rule; Successive differentiation and Leibnitz's theorem, Taylor's and Maclaurin's series of function of single variable, Expansion of functions of single variable.

Unit-II

Multivariable Calculus: Limit, continuity and partial derivatives, physical significance of partial derivative, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

Unit-III

Integral Calculus: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV

Sequences and series: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-V

Matrices: Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the significance of Rolle's Theorem, Mean Value theorem, Taylor's and Maclaurin's series for differentiable functions.
- **CO2.** Identify the extrema of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.

CO3. Use basic the integral rules to evaluate both definite and indefinite integrals and apply the same to find areas and volume of revolutions. Apart from these, they have a basic understanding of Beta and Gamma functions.

CO4. Apply the tools of power series and Fourier series to deal with functions of several variables that are essentials in most branches of engineering.

CO5. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

Text Books:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics, Jones & Bartlett

Reference Books:

1. **G.B. Thomas and R.L. Finney**, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester I

Course Title: Basic Electrical Engineering **Max. Marks:100**
Course Code: ESC-ECE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The course has been designed to provide basic knowledge to the students about the principles of electric circuit analysis, electromagnetism and transformers.

Unit-I

Review of Electric Circuits: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance. Capacitance), ohm's law, Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage & current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C Circuit Analysis: Power & energy relations, analysis of series parallel DC circuits, Star-Delta transformations (ΔY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Superposition Theorems (D.D Analysis only).

Unit-III

A.C. Circuit Analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-IV

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes

Unit-V

Basic Electrical Installation: Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcomes:

At the end of this course, students will demonstrate the ability

- **CO1.** To understand the concepts and applications of different laws used in the networks and circuits.
- **CO2.** To study and analyze the D.C. Circuit and A.C. Circuit with different theorem.
- **CO3.** To study the concepts related to electromagnetism.
- **CO4.** To understand the principle and working of transformers and power converters.
- **CO5.** To study and understand different types of electrical installations.

Text Books:

1. **D. P. Kothari and I. J. Nagrath**, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. **D. C. Kulshreshtha**, "Basic Electrical Engineering", McGraw Hill, 2009.

Reference Books:

1. **L. S. Bobrow**, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. **E. Hughes**, "Electrical and Electronics Technology", Pearson, 2010.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Prof Asif Husain	**Vishal Puri**	**Mehmood-ul-Hassan**	**Haider Mehraj**
(Dean SoET)	**(Head, ECE)**	**(A.P., ECE)**	**(A.P., ECE)**

Semester I

Course Title: Communication Skills | **Max Marks: 100**
Course Code: HSMC-ECE-121 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits: 2 [2-0-0]

Objective: This subject is designed to attain the general proficiency in English for the engineering students.

Unit-I

Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives., Synonyms, antonyms, and standard abbreviations.

Unit-II

Basic Writing Skills: Basic Writing Skills: Use of phrases and clauses in sentences, Importance of proper punctuation, Memos, Enquiry letter, Job Application letter, Adjustments and Sales letters, Techniques for writing precisely.

Unit-III

Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Articles, Prepositions, Redundancies and Clichés.

Unit-IV

Nature and Style of sensible Writing: Speaking skills- Interviews-Meaning, types of Interview, notices, Agenda, Minutes of meeting, writing introduction and conclusion.

Unit-V

Writing Practices: Comprehension, Précis Writing, Essay Writing

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Course Outcomes:

At the end of this course, the students will be able to:

- **CO1.** To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
- **CO2.** To make the students authoritative in self-expression in their day to day life in this fast-changing world.
- **CO3.** To identify the common errors involved in writing.
- **CO4.** To understand the nature and style of sensible writing.
- **CO5.** To write effective and coherent paragraphs.

Text Books

1. **Michael Swan**, Practical English Usage. OUP. 1995.
2. **F.T. Wood. Macmillan,** Remedial English Grammar**.**2007
3. **Liz Hamp-Lyons and Ben Heasly**, Study Writing. Cambridge University Press. 2006.
4. **Sanjay Kumar and PushpLata**, Communication Skills. Oxford University Press. 2011.

5. Exercises in Spoken English. Parts I-III. CIEFL, Hyderabad. Oxford University Press.

Reference Books

6. **Michael Swan**, Practical English Usage. OUP. 1995.
7. **F.T. Wood. Macmillan**, Remedial English Grammar.2007

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester I

Course Title: Engineering Mechanics **Max. Marks:100**
Course Code: ESC-ECE-122 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Objective: This course has been designed to make the students acquainted about forces and its effects, kinematics and statics.

Unit-I

Two Dimensional force System: Basic Concepts, principal of transmissibility, resultant of a force System, Free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, Varrigon theorem, friction, law of friction, equilibrium of body lying on horizontal and inclined plane, Static and Dynamic Friction, wedge friction, Ladder friction applications.

Unit-II

Centroid and Centre of gravity: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration composite ideas. Mass moment inertia of circular plate, Cylinder, Sphere.

Unit-III

Member forces in Trusses: Planer truss structure, trust joint identification, strategy for planer truss analysis, Statistical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and sections)

Unit-IV

Kinematics of Particles: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies' rotation, absolute motion, relative motion. Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

Unit-V

Virtual Work and Energy Method: Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

Course Outcomes:

Upon successful completion of the course, student should be able to:

- **CO1.** Use scalar and vector analytical techniques for analyzing forces in statically determinate structures
- **CO2.** Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts);

CO3. Understand basic dynamics concepts – force, momentum, work and energy;
CO4. Understand and be able to apply Newton's laws of motion;
CO5. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy.

Text Books:

1. **Bansal R.K.**(2010), A Text Book of Engineering Mechanics, Laxmi Publications
2. **Khurmi R.S.** (2010), Engineering Mechanics, S. Chand & Co.

Reference Books:

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall
2. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol I ,Vol II, 9th Ed, TMHill

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester I

Course Title: Computer Fundamentals **Max. Marks:100**
Course Code: ESC-ECE-123 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This subject is provided aiming to achieve a common knowledge of programming among engineering students.

Unit-I

Introduction:

History and Generations of Computers, Classification and Applications of Computers. Computer Hardware: Components of a computer system, Input and Output devices, Memory Hierarchy, Primary and Secondary memory. Computer Software, System and Application Software, Utility Programs.

Unit-II

Operating systems, Functions and types of O/S, DOS commands, BIOS, POST, Booting Process, Computer Virus, Types of Viruses, Use of Antivirus software.

Computer Languages (Machine, Assembly and High level languages), Translators (Assembler, Compiler and Interpreter). Introduction to algorithm and Flowchart.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

NETWORKING: Introduction to networking, Applications, types of computer networks, Network Topology, LAN, MAN, WAN. Networking devices: Hub, switch, router, repeater, and gateway. History of Internet, Internet, extranet and intranet, WWW, E-mail, ISPs, surfing, phishing.

Unit-V

Introduction to HTML: Introduction to HTML. Working of HTML, Creating and loading HTML page, tags, Structure of HTML, Document, Stand Alone Tags, Formatting text, Adding Images, Creating HyperLinks, Tables, Sending Emails through Web Page, Sample web pages.

Course Outcomes:

The student will be able to:

- **CO1.** To converse in basic computer terminology and Possess the knowledge of basic hardware peripherals.
- **CO2.** To understand the basics of computer languages, Softwares, Operating systems etc.
- **CO3.** To understand and use different number systems and their representations

CO4. To understand computer networks, devices used for networking, and services provided by the internet.
CO5. To understand html and to develop webpages

Text Books:

1. **Peter Norton:** Computing Fundamentals, 6th Edition, McGraw Hill-Osborne, 2007.
2. **V Rajaraman:** Fundamentals of Computers, 6th Edition, PHI Learning Private Limited 2014.

Referenced Books:

1. **Wendy Willard**: HTML: A Beginner's Guide, 3rd Edition, Tata-McGraw Hill 2006.
2. **Pradeep K. Sinha** Computer Fundamentals by, 6th Edition.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester I

Course Title: Indian Constitution | **Max Marks: 100**
Course Code: MC-ECE-121 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits:0

Course Objective: The basic purpose of this subject is to make a general awareness about our constitution.

Unit-I:

Constitutional Framework: Historical Background, Making of the constitution, Salient features of the Indian Constitution, Preamble to the Constitution, Union and its territory, Citizenship, Fundamental rights, Directive principles of state policy, Fundamental duties, Amendment of the constitution, Basic structure of the constitution.

Unit-II:

System of Government: Parliamentary system, Federal System, Centre-state relations, Inter-state relations, Emergency provisions

Unit-III

Central government: President, Vice-President, Prime Minister, Central Council of Ministers, Cabinet committees, Parliament, Parliamentary committees, Parliamentary forums, Supreme Court
State Government: Governor, Chief Minister, State Council of Ministers, State legislature, High court, Subordinate Courts, Special status of Jammu and Kashmir, Special provision for some states
Local Government: Panchayati raj, Municipalities

Unit-IV:

Constitutional Bodies: Election commission, Union Public service commission, State Public service Commission, Finance Commission, National Commission for SC's, National Commission for ST's, Special officer for Linguistic minorities, Comptroller and auditor general of India, Attorney General of India, Advocate General of India.

Unit-V

Non-Constitutional Bodies: Planning Commission, National Development Council, National Human Rights Commission, State Human Rights Commission, Central Information Commission, State Information Commission, Central vigilance Commission, Central Bureau of Investigation, Lokpal and Lokayuktas
Other Constitutional Dimensions: Co-operative societies, Official Language, Public services, Tribunals, Rights and Liabilities of the Government, Authoritative text of the Constitution in Hindi Language, Special Provision relating to certain classes.

Course Outcome:

Upon the completion of this, the students will able to know:

CO1. About the constitutional framework.
CO2. About the government system

CO3. Various type of government

CO4. About Constitutional bodies: Election commission, UPSC, SPSC, Commission for ST/SC etc.

CO5. Non-constitutional bodies: Planning Commission, NDC, NHRC, SHRC, CBI, Vigilance Commission and other dimensions of constitution.

Text/ Reference Books:

1. Indian Constitutional Law, M.P. Jain, 7th Edition.
2. Introduction to the Constitution of India, B. K. Sharma, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester I

Course Title: Basic Electrical Engineering Lab | **Max. Marks:50**
Course Code: ESC-ECE-131 | **University Exam: 25**
Duration of Exam: 2 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objective: The lab has been designed to provide and implement basic knowledge about the principles of electric circuit analysis, electromagnetism and transformers to the students.

List of experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin's Theorem & Norton's Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Laboratory Outcomes

- **CO1.** To study and analyze different circuit elements
- **CO2.** To study and implements different laws and theorems of electrical circuits.
- **CO3.** To make the students aware about the principles and applications of basic electrical laws.
- **CO4.** To measure the power using two wattmeter method.
- **CO5.** To study and analyze the phenomenon of Resonance in Series and Parallel circuits.

Semester I

Course Title: Communication Skills Lab | **Max Marks: 100**
Course Code: HSMC-ECE-131 | **University Examination: 25**
Duration of Exams: 2 hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Course Objective: The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

The following course content is prescribed for the English Language Laboratory sessions:

Syllabus

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Course Outcomes:

CO1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning

CO2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

CO3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking

CO4. To improve the fluency in spoken English and neutralize mother tongue influence

CO5. To train students to use language appropriately for interviews, group discussion and public speaking

Semester I

Course Title: Engineering Mechanics Lab | **Max. Marks:50**
Course Code: ESC-ECE-132 | **University Exam: 25**
Duration of Exam: 2 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objective: The objective of the Engineering mechanics Lab is to perform experiments which are related to Statics and Dynamics Loading in order to understand the behavior of different mechanical equipment's which students study in theory.

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/ brinel/ Rockwell hardness testing machine.
5. To verify Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Laboratory Outcomes

After the completion of the lab course, the students will be:

- **CO1.** Able to understand different engineering mechanics apparatus.
- **CO2.** Able to understand the mechanical properties of materials.
- **CO3.** Able to understand the moment of inertia of various shapes.
- **CO4.** Get the practical idea of frictional forces.
- **CO5.** Get working principle of screw jack.

Semester I

Course Title: Computer Fundamentals Lab **Max. Marks:50**
Course Code: ESC-ECE-133 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. objectives: The course is designed to provide practical foundation for the computer programming and to familiarize students with components of computer and its troubleshooting.

List of Experiments:

1. Experiments on dismantling of PC.
   a. Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components.
2. Perform these DOS commands
   a. Internal commands.
   DIR, TYPE, DEL, ERASE, MD, CD, COPY, RMDIR, VER, DATE, TIME, PATH, CLS, RMDIR, VER, DATE, TIME, PATH, CLS, BREAK, SET, EXIT.
   b. External commands.
   APPEND, CHKDISK, ATTRIB, SYS, EDIT.
3. Experiments on system utilities
   a. Explore and describe some system utility like regedit, memory partioning, control panel, window tools.
4. MS-Word: Introduction, Starting MS-Word, MS-Word Screen and its Components, Elementary Working with MS-Word.
5. MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
6. Create a spreadsheet of students, which contains marks obtained by students of a class in different subjects and then calculate maximum, minimum, average and sum of marks in each subject. Also calculate % of each student using functions and formulas in MS-Excel also draw pie chart and bar graph also.
7. MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.
8. Make a simple presentation on your college, use 3D effects, animation on network topologies.
9. Create HTML pages for your business website.
10. Create HTML pages showing timetable of trains departing from Jammu-Tawi railway station.
11. Create web pages for your college.

Semester I

Course Title: Workshop Practice | **Max Marks: 100**
Course Code: ESC-ECE-134 | **University Examination: 25**
Duration of Exams: 2 hours | **Sessional Assessment: 25**
Credits: 2 [1-0-2]

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods
2. Fitting operations & power tools
3. Electrical & Electronics
4. Carpentry
5. Plastic moulding, glass cutting
6. Metal casting
7. Welding (arc welding & gas welding), brazing

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

1. Machine shop
2. Fitting shop
3. Carpentry
4. Welding shop
5. Smithy

Course Outcomes:

Upon completion of this laboratory course, students will be able to:

- **CO1.** Fabricate components with their own hands.
- **CO2.** Gain practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- **CO3.** Produce small devices of their interest by assembling different components.

Text/References Books:

1. **Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., —**Elements of Workshop Technology‖, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. **Kalpakjian S. And Steven S. Schmid**, —Manufacturing Engineering and Technology,4th edition, Pearson Education India Edition, 2002.

Semester I

Course Title: Induction Training | **Max. Marks:0**
Course Code: MC-ECE-131 | **University Exam: 0**
Internal Assessment: 0
Credits: 0 [0-0-0]

Induction program

Induction program for students to be offered right at the start of the first year. It should include but not limited to following Activities:

1. Physical activity
2. Creative Arts
3. Universal Human Values
4. Literary
5. Proficiency Modules
6. Lectures by Eminent People
7. Visits to local Areas
8. Familiarization to Dept./Branch & Innovations

Semester – II

Semester II

Course Title: Mathematics-II | **Max. Marks:100**
Course Code: BSC-ECE-221 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This course is designed to impart advanced knowledge of multivariable integration, theory of differential equations and complex variable to engineering students that will serve them to solve real life engineering problems.

Unit- I

Multivariable Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes' (without proofs).

Unit- II

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type. Second order linear differential equations with variable coefficients, method of variation of parameters.

Unit- III

Partial Differential Equations: Partial differential equations and its formation, Linear and non-linear partial differential equations of first order and their solutions, Charpit's method, Lagrange's method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions, Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables.

Unit- IV

Complex Variable – Differentiation: Differentiation, Cauchy-Riemann equations, analytic functions, elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit- V

Complex Variable – Integration: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem (without proof) and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Course Outcomes:

Upon the completion of this course, the students will be able to:

- **CO1.** Compute double and triple integrals over rectangular and spherical domains and memorize important theorems: Green, Gauss divergence and Stokes with their applications in various engineering problems.
- **CO2.** Distinguish between linear and non-linear equations. Recognize and solve equations of Bernoulli, Euler and Clairaut.
- **CO3.** Solve partial differential equations of various kinds and apply the same to solve problems of real world.
- **CO4.** Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.
- **CO5.** Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.

Text Books

1. **Erwin Kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics**,** Jones & Bartlett.

Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: Basic Electronics | **Max Marks: 100**
Course Code: ESC-ECE-221 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits: 4[3-1-0]

Course Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semiconductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semiconductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, use of transistor as a switch.

Unit-IV

Biasing Techniques and biasing stability (BJT):- Need for biasing, operating point, load line analysis, bias stability. fixed bias configuration, emitter bias configuration, voltage divide bias configuration, analysis of these biasing techniques.

Unit-V

Field Effect Transistors: Operation and characteristics of JFET and MOSFET, types of MOSFET, Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Colpitts and Phase Shift oscillators (transistor version only and no derivation).

Course outcomes:

At the end of the course, the student will be able to:

- **CO1.** Describe the energy bands and the scientific principles behind conductivity in semiconductors.
- **CO2.** Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.

CO3. Analyze the working of various traditional transistors such as BJT and FET along with the recently used MOSFET based transistors as well as the concept of biasing in these transistors.

CO4. Understand various feedback systems and oscillators.

CO5. Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Sedra & Smith,** Microelectronic Circuits, Oxford Printing Press.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: Engineering Physics | **Max Marks: 100**
Course Code: BSC-ECE-222 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Unit-I

Waves, Oscillations and Introduction to Acoustics: Wave motion, its types, Equations of wave motion, Energy and Intensity of a progressive wave, Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves, their detections and applications. A brief introduction to the acoustics of a hall, factors affecting the acoustics of the buildings, Reverberation Period, Sabine's Formula for calculating Reverberation Time.

Unit-II

Electrostatics in a linear dielectric medium & Magnetostatics: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics – Point charge at the centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. Magnetostatics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Unit -III

Quantum Mechanics for Engineers: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wavefunction, Born interpretation, probability current, Expectation values, Free-particle wavefunction and wave-packets.

Unit-IV

Applying the Schrodinger equation: Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator.

Unit-V

Optics: Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings. Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra. Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

Course Outcomes:

After completing of the course, the students will:

CO1. Understand the importance of Applied Physics in describing the technology we are using

today in different engineering fields

CO2. Acquired knowledge of Waves, Vibration and acoustics, helps the students to develop the acoustically good hall.

CO3. Knowledge of basic Quantum Mechanics can help the students for further research applications as they can be applied to any quantum, mechanical situation to find energy, momentum etc.

CO4. Acquired knowledge of Optics help the students to:

a) Know more about propagation of light and wave optics.
b) Describe the requirements for a system to act as a laser.
c) Differentiates the various types of lasers and their means of excitation.
d) Able to explain, which laser would best meet the need for an industrial or research task.
e) Demonstrate an awareness of the safety responsibilities involved in working with lasers.

Suggested Books:

1. **Pathania K. S. & Khera S. K.,** Waves and Vibration,
2. **Beiser, Arthur**, Concepts of Modern physics, TMH.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: Engineering Chemistry | **Max Marks: 100**
Course Code: BSC-ECE-223 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course is designed to familiarizing the students of engineering with Water treatment, polymerisation, photochemistry, corrosion and transition metal chemistry.

Unit-I

Water Treatment; Water quality measurement, Hardness of water, Estimation of hardness of water, Disadvantages of hard water ,Scale and sludge formation; disadvantages, prevention and treatment, Desalination method, reverse osmosis ,Electro dialysis, Domestic water treatment.

Unit-II

Polymerisation: Basic concept of polymerisation, Broad classification and industrial applications (Buna-N, Buna-S, Polyester, Polyethene, Polypropene, Polystyrene,), Thermosetting plastic and its softening, Biodegradable and non-biodegradable wastes.

Unit-III

Photochemistry: Photo excitation, Luminescence and types, Norrish-I and Norrish-II reactions, Application examples of photolysis, Photosynthesis Z –Diagram, Chemistry of vision, MRI equipment and procedure of working.

Unit-IV

Transition Metal Chemistry: Structure of organic compounds up to coordination no 6, Isomerism (geometrical, optical, ionisation, linkage and coordination isomerism, bonding in coordination compounds by CFT, VBT. Application of coordination compounds in organic synthesis and Medical fields.

Unit-V

Cement and Lime: Introduction and types of cement, Manufacture of Portland Cement, Setting and hardening of cement, Introduction and properties of Lime, Setting and hardening of lime.

Course Outcome:

At the end of course, the student will be able to

- **CO1.** Apply the methods to produce soft water for industrial use and potable water at cheaper cost.
- **CO2.** Substitute metals with conducting polymers and also produce cheaper
- **CO3.** Bio-degradable polymers to reduce environmental pollution,
- **CO4.** Apply knowledge about photochemical and photo physical processes and the reactivity of excited states to explain applications in photochemical energy conversion.
- **CO5.** Understand structure of organic compounds and transition metal compound synthesis,

CO6. Understand the manufacturing process of cement and lime.

Text Books:

1. **Odion G.G**-Principles of Polymerisation, John Wiley and sons.
2. **S.S Dara**-A Text Book of Engg. Chemistry.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: C-Programming **Max. Marks:100**
Course Code: ESC-ECE-222 **University Exam: 50**
Duration of Exam: 3 Hours **Internal Assessment: 50**
Credits: 3

Course Objective: This course is provided aiming to enhance the logical skills of engineering students with the basic programming concepts and implementation in C Programming.

Unit-I

Introduction to C Programming: Overview of programming languages, algorithms and flowcharts, History of C, Structure of a C Program, Compiling & Executing a C program. Constants, Variables and Data Types, Storage classes, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Looping: while statement, do-while statement, for statement.

Unit-III

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, strings, basic string operations**.**

User defined data types: Structure, Defining structures, Array of Structures, Introduction to Union and enumerated data types.

Unit-IV

Functions: Introduction to Function, Types of functions, function declaration, calling a function, passing arguments to functions, passing arrays to functions, Recursion.

Unit-V

Introduction to Pointers & Files: Operations on pointer, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Introduction to File, Operations on files: open, close, read and write.

Course Outcomes:

The student will be able:

1. To translate the algorithms and flowcharts to programs (in C language) for execution.
2. To make the usage of various control statements for developing an efficient program to solve the problems.
3. To decompose a complex problem into functions for solving it efficiently.
4. To use the arrays and user defined data types for synthesizing a complete program.
5. To use pointers, files and dynamic memory allocations to perform several operations in programs.

Text Books

1. **Brian Kernighan and Dennis Ritchie,** The C Programming Language-2nd Edition, (Prentice Hall Software)
2. **Yashavant P. Kanetkar ,** Let Us C, BPB Publication, 15th Edition**.**
3. **Gottfried**, Programming with C, TMH.

Reference Books

1. **E. Balaguruswamy**, Programming in ANSI C, Tata McGraw-Hill.
2. **Venugopal,** C Programming, TMH.
3. **Yashwant Kanitkar**, Pointers in C, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Semester II

Course Title: Environmental Science | **Max. Marks:100**
Course Code: MC-ECE-221 | **University Exam: 50**
Duration of Exam: 3 Hours | **Internal Assessment: 50**
Credits: 0

Course Objective: This course is designed to make the engineering students to understand the significance of environment and ecology in human survival and growth. It also aims to connect the budding engineers to nature.

Unit-I

Elements of Ecology: Definition, Scope and basic principles of ecology and environment. Biological levels of organization, population, community, ecosystem and biosphere. Climatic factors - Solar radiations, temperature, water and precipitation.

Unit-II

Environmental pollution: Types of pollution, Air pollution, Noise pollution, Water pollution, Soil pollution, Thermal pollution, Radiation pollution

Unit-III

Biogeochemical Cycles: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Global Oxygen Cycles. Hydrological cycles.

Unit-IV

Succession: Concepts of succession, Types of Succession, Trends in succession, Climax and stability, Co-evolution and group selection.

Unit-V

Major biomes of the world, Characteristics of terrestrial fresh water and marine ecosystems; Forests, grasslands, lake, river and marine ecosystems of India.

Course Outcomes:

Upon the completion of the course, students will able to:

- **CO1.** Learn about the environment and ecology.
- **CO2.** Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
- **CO3.** Understand biogeochemical cycles and human contribution in it.
- **CO4.** Learn succession and various types of succession.
- **CO5.** Demonstrate the ability to understand the biomes of world and its importance in human survival.

Books Suggested:

1. **J.S.Singh, S.P. Singh and S.R. Gupta**. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi), 2008.

2. **S.C. Santra**. Environmental Science. New Central Book Agency, 2011.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester II

Course Title: Basic Electronics Lab | **Max Marks: 50**
Course Code: ESC-ECE-231 | **University Examination: 25**
Duration of Exams: 2 hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with basic electronic devices, their applications and characteristics.

List of Experiments:

1. To plot the Resonance curve for a series & parallel resonance.
2. To determine and plot operating characteristics of a PN junction diode
3. To study the input / output waveforms of Half wave and bridge wave rectifiers
4. To suppress the ripple in rectifiers using RC filters.
5. To study the clipper and clamper circuits.
6. To study the Zener characteristics and its application as voltage regulator
7. To plot characteristics of transistor in CE/CB configuration
8. To plot characteristics of a BJT.
9. To plot MOSFET characteristics.
10. To study frequency response of RC Coupled Oscillators.

Laboratory Outcomes:

- **CO1.** Determine the characteristics of PN Junction and Zener diode.
- **CO2.** Design various rectifiers configuration and evaluate its various performance parameters.
- **CO3.** Design and analyze various wave shaping circuits.
- **CO4.** Determine the characteristics of a BJT and MOSFET
- **CO5.** Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents. Experimentation to be supported by computer simulations.

Semester II

Course Title: Engineering Physics Lab | **Max. Marks:50**
Course Code: BSC-ECE-231 | **University Exam: 25**
Duration of Exam: 2 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with experimental apparatus, the scientific method and method of data analysis.

List of Experiments:

1. Measurement of Resistance.
2. Measurement of e/m by Helical method/Thomson's method.
3. Determination of Resistivity of a given wire.
4. Determination of Band Gap of a semiconductor.
5. To determine the refractive index of the prism material using spectrometer.
6. To determine Young's modulus of a bar.
7. To determine the wavelength using Fresnel's bi-prism/diffraction grating.
8. To Determine Plank's Constant.
9. Verify the Stefan's law by incandescent lamp
10. To determine the susceptibility of a ferromagnetic material
11. Study of nano TiO2 solar cell
12. Ultrasound measurement a given liquid
13. Joule's constant experiment
14. Determination of unknown capacitance of a capacitor by de-Sauty bridge method.
15. Refractive index of a glass slab/ water by travelling microscope
16. To determine the frequency of an ac supply by using electrical vibrator
17. To find the inner and outer diameter of a hollow cylinder by using Vernier caliper.
18. To determine the diameter of a thin wire by using screw gauge and its area of crossection.
19. Measurement of 'g' and Time period by using compound pendulum.
20. To find the viscosity of a liquid using stoke's method.

Laboratory Outcomes:

- **CO1.** Develop skills to impart practical knowledge in real time solution.
- **CO2.** Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
- **CO3.** Design new instruments with practical knowledge.
- **CO4.** Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.
- **CO5.** Understand measurement technology, usage of new instruments and real time applications in engineering studies.

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Semester II

Course Title: Engineering Chemistry Lab | **Max Marks: 50**
Course Code: BSC-ECE-232 | **University Examination: 25**
Duration of Exams: 2 hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. Objective: The course is designed to provide experimental foundation for the scientific method for analysis, synthesis and determination of various chemicals

List of Experiments:

1. Acid Base Titrations.
2. Viscosity of Solutions, Determination of composition of sugar solutions from Viscosity.
3. Synthesis of Aspirin.
4. Determination of Functional Groups in Organic Compounds.
5. Synthesis pf p-Nitro Aniline from Acetanilide.
6. Conductometric Titrations.
7. Determination of Proteins in given sample of Food.
8. Determination of Flash and Fire Point of a Lubricant.

Laboratory Outcome:

At the end of practical course the students will be able to:

- **CO1.** Perform Titrations
- **CO2.** Synthesize organic compounds,
- **CO3.** Do protein determination and viscosity of solutions
- **CO4.** Learn temperature dependent properties of lubricant.
- **CO5.** Work as a team.

Semester II

Course Title: C-Programming Lab **Max Marks: 50**
Course Code: ESC-ECE-232 **University Examination: 25**
Duration of Exams: 3 hours **Internal Assessment: 25**
Credits: 3 [1-0-4]

Objective: The course is designed to provide practical foundation for computer programming and to familiarize students with error handlings in programming

List of Experiments:

1. Familiarization with programming environment.
2. Basic programs in Sequential Statement in C
3. Simple computational problems using arithmetic expressions.
4. Problems involving if-then-else structures.
5. Iterative/looping problems e.g., sum of series.
6. Performing operations on 1D Array.
7. Performing operations on 2D Array.
8. Performing operations on String.
9. Programs on Function declaration, definition and calling.
10. Implementation of Mathematical function
11. Programming for solving Numerical methods problems.
12. Programs on Recursive functions.
13. Programs on Pointers and structures.
14. Programs on File operations.

Laboratory Outcome:

At the end of practical course the students will be able to:

Lab. Outcomes

1. To be able to correct syntax and logical errors as reported by the compilers and run time for basic programs.
2. To be able to write iterative as well as recursive programs using functions as well
3. To be able to represent data in arrays, strings and structures and manipulate through a program
4. To be able to declare pointers of different types and use them in defining self-referential structures.
5. To be able to create, read and write to and from simple text files.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Semester II

Course Title: Engineering Graphics Lab | **Max Marks: 100**
Course Code: ESC-ECE-233 | **University Examination: 60**
Duration of Exams: 3 hours | **Internal Assessment: 40**
Credits: 3 [1-0-4]

Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses. Projections: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of Straight line and their Traces: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of Surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. sectional orthographic views of geometrical solids, Purpose of development, Development of prism, cylinder, cone and pyramid surface

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non-symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projectionIsometric

Views of lines, Planes, Simple and compound Solids; Difference between isometric projection and Isometric view, Isometric projection of solids such as cube, prism, pyramid and cylinder. Introduction to computer aided drafting (CAD)

Text Books:

1. Bhat, N. D. & Panchal, V. M, *Engineering Drawing*, Charotar Publishers, Anand.
2. Narayana, K. L. & Kannaiah P, *Engineering Graphics*, Tata McGraw Hill, New Delhi.

Reference Books:

1. Gill P. S., *Engineering Graphics and Drafting*, Katria and Sons, Delhi.
2. Luzzadde Warren J., *Fundamentals of Engineering Drawing*, PHI.

Laboratory Outcome:

At the end of practical course the students will be able to:

- **CO1.** To read Engineering Drawing and execute the construction work with the help of available drawing
- **CO2.** To represent three dimensional objects by two dimensional views.
- **CO3.** Be in a position to show hidden details of objects or underground constructions work by drawing sectional views.
- **CO4.** Exposure to creating working drawings
- **CO5.** Exposure to the visual aspects of engineering design

Note for paper setter: The Question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit. Questions must be set in such a way that the students be able to answer 5 questions within 3 hours.

Semester – III

Semester III

Course Title: Mathematics-III **Max. Marks:100**
Course Code: BSC-ECE-321 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The objective of this course is to familiarize the students with various transform. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

Unit-I

Integral Transform-I: Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integro-differential equations.

Unit-II

Integral Transform-II: Fourier integral, Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

Unit-III

Z-Transform: Introduction and definition of z-transform, some standard forms, Linearity property, Damping rule Some standard results, shifting u_n to the right and to the left, Multiplication by n. Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

Unit-IV

Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables,

Unit-V

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the basic concepts and techniques to solve Laplace transform and also learn to apply the same to solve various problems of engineering which are modelled through differential equations

CO2. Demonstrate the ability to understand the basic concepts and techniques to solve Fourier's transform and also learn to apply the same to find solutions of boundary value problems (BVP).

CO3. Apply the concepts of the z-transform in solving difference equations and other discreet signal system.

CO4. Learn the ideas of probability and random variables and various discrete and continuous probability distributions and their properties.

CO5. Understand the basic ideas of statistics including measures of central tendency, correlation and regression and apply various statistical methods in engineering problems.

Text Books:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **Ross, A:** First Course in Probability, 6th Ed., Pearson Education India, 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester III

Course Title: Network Analysis & Synthesis | **Max Marks: 100**
Course Code: PCC-ECE-321 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of electrical networks and their synthesis.

Unit-I

Network Theorems & Network Topology: Network Theorems Superposition, Reciprocity and Millman's, theorems, Thevenin's and Norton's theorems; Maximum Power transfer theorem (A.C Analysis only)

Network Topology: Graph of a network, Concept of tree and co-tree, incidence matrix, tie-set, and cut-set schedules, Formulation of equilibrium equations in matrix form, Solution of resistive networks, Principle of duality.

Unit-II

Capacitive, Inductive Transients & First Order Circuits: Capacitive Transients, Inductive Transients, Combination of Capacitance & Inductance, Initial and Final Conditions, Exponential Functions, Timing Intervals of First and 2^{nd} Order Circuits. Laplace Transform application to solve differential equations and analysis of electric circuits.

Unit-III

Two Port Networks Parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port network in different parameters. Interconnection of two port networks. Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.

Unit-IV

Network Synthesis: Transfer Functions, Natural and Forced Responses, Poles and Zeros of Transfer Functions, Foster and Caure's Forms, Stability, Hurwitz's Polynomials.

Unit-V

Filter Synthesis: Introduction, Classifications of filters, Characteristic Impedance and propagation constant of pure reactive networks, Ladder network, T–Section, Pie Section, Terminating Half Section, Pass Bands and Stop Bands, Design of constant K, n – Derived Filters, Composite Filters.

Course Outcomes:

After completion of the course student will be able to:

CO1. Apply network theorems for the analysis of electrical circuits

CO2. Provide solution for first and second order networks and obtain the transient and steady-state response of electrical circuits.

CO3. Analyze two-port circuit behavior

CO4. To synthesize various networks using different synthesis techniques.

CO5. To understand and synthesize different types of filters.

Text Books:

1. **M.E. Van Valkenburg, "**Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhary, "Networks and Systems", New Age International Publications, 1998

Reference Books:

1. **Stanley,** Network Analysis with Applications, Pearson Education.
2. **Mittal G. K.**, Network Analysis, Khanna Publications.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester III

Course Title: Advanced Electronic Circuits | **Max Marks: 100**
Course Code: PCC-ECE-322 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: To develop an understanding of transistor equivalent models and applications of transistors for designing Power and Feedback amplifiers and oscillator circuits.

Unit-I

Low Frequency Transistor Analysis: complete h parameter model of BJT, Analysis and Design of transistor amplifier circuits using h parameters, frequency response of amplifiers, Multistage Amplifier, Darlington compound configuration

Unit-II

High Frequency Transistor Analysis: High frequency hybrid – pi model, analysis and design of transistor amplifier circuits, approximate CE high frequency model with resistive load, CE short circuit current gain

Unit-III

Power Amplifier: Classification of power amplifiers, Class A, Transformer Coupled Amplifier, Transformer Coupled Audio Amplifier, Push Pull Amplifier, Complimentary Symmetry Circuits, Class B, Class AB, Class D operation

Unit-IV

Feedback Amplifier: Feedback concept, characteristics of negative and positive feedback. Effect of negative and positive feedback on performance parameters. Negative Feedback Amplifier Configurations: Voltage series, Voltage shunt, Current series, Current shunt types of Negative feedback, Typical MOSFET and BJT amplifier circuits and their analysis.

Unit-V

Oscillator: Basic Oscillator circuit, Barkhausen's criteria, Phase shift Oscillator, Wien bridge Oscillator, Hartley Oscillator, Colpitt Oscillator, Tuned Oscillator circuits, Crystal Oscillator (BJT version only)

Course Outcomes:

After completion of the course student will be able to:

CO1. To understand the transistor equivalent circuits at high and low frequencies.

CO2. To analyse transistor circuits based on approximate analysis.

CO3. To understand working of power amplifiers and the feedback amplifiers.

CO4. To understand basic oscillator operation and analysis of various oscillators circuits.

Text Books:

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1. **Millman & Halkias** -Integrated devices & circuits.
2. **Sedra and Smith**- Microelectronics.

Reference Books:

1. **Boylestad**- Electronic Devices & Circuit.
2. **David A. Bell**- Electronics Devices and Circuits.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester III

Course Title: Solid State Electronic Devices | **Max Marks: 100**
Course Code: PCC-ECE-323 | **University Exam:60**
Duration of Exam: 3 Hours | **Internal Assessment:40**
Credits: 3 [3-0-0]

Objective: To understand the device physics and numerically analyse device behavior in various semiconductor devices.

UNIT I

Free Electron Theory: Energy bands in solids, Introduction to principles of Quantum Physics, Derivation of Schrodinger's wave equation, Schrodinger's wave solution to electron in an infinite potential well, finite potential, tunnelling through barrier, electronic conductivity and mean free time

UNIT II

Band Theory of Electronic Conduction: Kroning-penny model, Bloch wave, Block Theorem, Brillion zones, effective mass, Density of states in three, two, one and zero dimensions. Electron and hole conduction, carrier mobility and scattering mechanisms

UNIT III

Semiconductor Physics: Fermi-Dirac distribution function, Equilibrium conditions and derivations for electron and hole concentrations, intrinsic Fermi level, Extrinsic semiconductors, Donor & Acceptor states, carrier concentration & Fermi level, intrinsic concentration and temperature

UNIT IV

Transport and Recombination Phenomenon: Continuity equation, Ambipolar transport equation (Solved examples), Concepts of minority carriers and low-level injection, Types of Recombination, Graded semiconductor, concepts of deep level & shallow levels

UNIT V

Metal-Semiconductor contact, MOSFET device physics, BJT's, Junction Luminescence, Spontaneous emission and carrier lifetime, Stimulated emission, Lasers and Photodetectors (basics)

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** To understand and analyse the energy bands in semiconductors.
- **CO2.** To apply Fermi-Dirac distribution function for analysis of semiconductors.
- **CO3.** To understand ambipolar transport in semiconductors through application of continuity equation.
- **CO4.** To understand concepts of generation and recombination and excess carriers.

Text Books:

1. **Streetman, Ben G. & Banerjee, Sanjan,** Solid State Electronic Devices (5th Edition) PHI Private Ltd, 2003 Ed.
2. **Donald A. Neamen**, Semiconductor Physics and Devices.
3. **S.Wang**, Fundamentals of Semiconductor Theory.
4. **S.S. Islam**, Semiconductor Physics and Devices.

Reference Books:

1. **Yannis, Tsividis,** Operation & Mode line of The MOS Transistor (2nd Edition) Oxford University Press, 1999 Ed.
2. **Gupta, Nandita Das & Gupta, Aamitava Das**, Semiconductor Devices Modeling a Technology, PHI, 2004 Ed.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester III

Course Title: Digital Electronics | **Max Marks: 100**
Course Code: PCC-ECE-324 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit-I

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Boolean algebra, Boolean Theorems, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Simplification techniques and Minimization methods: K-MAPS, Q-M (Tabulation) method.

Unit-II

Combinational Logic Circuits: Design and Analysis of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, Subtractors, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers, seven segment display.

Unit-III

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF), Edge-Triggered Flip-Flops, characteristic tables and excitation tables, conversion of flip-flops, Design of Flip-Flops using state diagrams and state tables, state reduction and assignment.

Unit-IV

Basic Flip-Flop Applications: Shift registers and Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In -Parallel Out Shift Registers, Bidirectional Shift Registers, Synchronous and Asynchronous Counter Operation, Mod-n Counters, Design of counters.

Unit-V

Basics of Semiconductor Memories: Random-Access Memories (RAM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA, IEEE notations

Introduction to digital logic families: brief background and comparison of various logic families-TTL, ECL, MOS, CMOS.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Examine the structure of various number systems and its application in digital design.
- **CO2.** Understand, analyze and design various combinational and sequential circuits.
- **CO3.** Analyze different types of registers and design counter circuits.

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CO4. Analyze different logic families, their characteristics and performances

CO5. Design solutions to real world problems.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Anil K Miani**, Digital Electronics, Wiley publications.

Reference Books:

1. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.
2. **P. Malvino**, Digital principles and applications, Tata McGraw.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester III

Course Title: Electronic Measurements & Instrumentation | **Max Marks:100**
Course Code: PCC-ECE-325 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Unit-I

Measurement Systems and Characteristics of Instruments: Basics of Measurement and Instrumentation, Static and Dynamic characteristics. Significant Figures, Types of error, Probability of error, Limiting errors. DC ammeter, DC Voltmeter, Voltmeter Sensitivity, Digital Voltmeter, Series type and Shunt type Ohmmeter, Electronic Multimeter. Calibration of DC instruments.

Unit-II

Signal Generators: Sine wave, Sweep- frequency, Pulse and square wave generator, Frequency synthesized signal generator,

Wave Analyzers: Harmonic distortion analyzers, Spectrum analyzers.

Unit-III

Bridge Circuits for RLC Measurements & Potentiometers: Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency, Q-Meter. Potentiometers: principle of operation, DC and AC potentiometers. Application of potentiometers.

Unit-IV

Cathode Ray Oscilloscopes: CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, dual beam CRO, measurement of amplitude and frequency. Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO (active and passive), attenuator type

Unit-V

Transducers: Classification of transducers, Strain Gauges, Displacement transducer, Temperature measurement, photosensitive devices.

Fiber Optics Measurements: Fiber optic power measuring, end-to–end measurement of fiber system loss, optical time domain Reflectometer. Calibration and standards, Data acquisition systems.

Course Outcomes:

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After completion of the course student will be able to:

- **CO1.** Test and Measure various electronics quantities with accuracy and precision
- **CO2.** To understand principle of signal generation and wave analysis.
- **CO3.** To understand bridge measurements for RLC circuits.
- **CO4.** To understand principle and working of CRO.
- **CO5.** Apply principles of transducer for selecting transducers in engineering applications and to understand measurement mechanism in optical communication system.

Text Books:

1.Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 2002, 5/e.

2. Electronic instrumentation – H.S.Kalsi, Tata McGraw Hill, 2004, 2/e

Reference Books:

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2003, 2/e.

2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2004, 2/e.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will beset from each unit. The student has to attempt five questions at least one question from each unit.

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Semester III

Course Title: Advanced Electronic Circuits Lab | **Max Marks: 50**
Course Code: PCC-ECE-331 | **University Exam:25**
Duration of Exam: 2 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. To study bipolar transistor as a switch.
2. To demonstrate use of a BJT in a CE amplifier circuit configuration and study its frequency response.
3. To plot a load line for a CE amplifier and show effect of input signal on Q-point.
4. To study RC coupled Single stage & double stage BJT amplifier and determination of the gain-frequency response, input and output impedances.
1. To study BJT Darlington Emitter follower with and without bootstrapping and determination of the gain, input and output impedances (Single circuit).
2. To study the characteristics of a Class- A amplifier.
3. To study the characteristics of Class- AB amplifier.
4. To study the characteristics of Class- B push-pull amplifier.
5. To design oscillator circuits using BJT, op-Amp and FET and determine frequency of oscillation.

Course Outcomes:

After completion of the course student will be able to:

CO1. Verify the characteristics of BJT in CC, CE, CB configurations by measuring output response of each.

CO2. Determine gain- frequency response, input and output impedances of RC coupled Single stage & double stage BJT amplifier.

CO3. Determine gain- frequency response, input and output impedances of RC coupled Single stage & double stage FET amplifier.

CO4. Determine gain, input and output impedances of BJT Darlington Emitter follower with and without bootstrapping.

CO5. Function effectively as a team.

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Semester III

Course Title: Digital Electronics Lab | **Max Marks: 50**
Course Code: PCC-ECE-332 | **University Exam:25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. Study of pin diagram of various ICs and to test the logic gates and verify their truth tables.
2. Implementation of following combinational circuits using Logic Gates.
    a. Half and Full Adder.
    b. Half and Full Subtractor.
3. Implementation of Multiplex, De-multiplexer, Decoder and Encoder.
4. Implementation of Boolean functions using MUX.
5. To add two 4-bit binary numbers using IC 7483.
6. To verify the operation of different modes of shift register using IC 7495.
7. Design of BCD to 7 segment display using logical gates.
8. Implementation of different Flip-Flops.
9. Implementation of Shift registers and Counters using Flip-Flops.
10. Simulations
    a. Introduction to circuit maker and electronic work bench.
    b. Implementation of experiments from Serial No. 1 to 9 through simulations.

Course Outcomes:

After completion of the course student will be able to:

CO1. Test and verify logic gates with its truth.
CO2. Implement basic arithmetic circuits.
CO3. Implement Multiplexer, De-Multiplexer, Encoder & Decoder circuits.
CO4. Use modern engineering and IT tools for circuit simulations.
CO5. Function effectively as a team.

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Semester III

Course Title: Network Analysis Lab | **Max Marks: 50**
Course Code: PCC-ECE-333 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Verification of Thevenin's theorem, Norton's theorem.
2. Verification of Maximum power transfer theorem, Superposition theorem.
3. Verification of Reciprocity theorem.
4. Design and implementation of T and Π passive filters.
5. Determination of h-parameters of a network.
6. Study of sinusoidal steady state response of a network.
7. Study of transient response of a network.
8. Study of passive integrator and differentiator.
9. Synthesis of RC-network for a given network function.
10. Verification of equivalence of star and delta transformation.

Course Outcomes:

After completion of the course student will be able to:

CO1. Verify various network Theorems.
CO2. Design various types of Filter using bread board.
CO3. Evaluate steady and transient state response of a network.
CO4. Synthesize RC-networks.
CO5. Function effectively as a team.

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Semester – IV

Semester IV

Course Title: Numerical Techniques **Max Marks: 100**
Course Code: BSC-ECE-421 **University Exam:60**
Duration of Exam: 3 Hours **Internal Assessment:40**
Credits: 4 [3-1-0]

Course Objective: This Course aims at providing the necessary basic concepts of a numerical techniques and give procedures for solving numerically different Kinds of problems occurring in engineering and technology.

Unit-I

Solutions to Algebraic and Transcendental Equations:

Solutions to algebraic and transcendental equations by iterative, Bisection, Regula-Falsi, Newton-Raphson methods and Secant Methods.

Unit-II

Interpolation: Finite-differences and operators, Relation between operators, Interpolation With Equal Intervals – Newton's Forward And Backward Difference Formulae, Interpolation With Unequal Intervals – Lagrange's Interpolation – Newton's Divided Difference Interpolation .

Unit-III

Numerical Differentiation & Integration

Introduction to Numerical differentiation and integration, Errors in Numerical differentiation, Trapezoidal rule, Simpson's one-third rule, Simpson's third-eight rule, Boole's rule and Weddle's rule, Newton-Cote integration formula.

Unit-IV

Matrix and Linear System of Equations

Direct Methods: Gauss and Gauss-Jorden method, Crout's Triangularization method, Iterative methods: Gauss –Jacobi and Gauss Seidel method, Newton method for nonlinear simultaneous equations

Unit-V

Numerical Solutions to Ordinary Differential Equations:

Numerical solution of ordinary differential equations by Taylor's Series, Picard's method, Euler's method, Modified Euler's method and Runge-Kutta method of 4^{th} order, Finite-difference method for Boundary value problems

Course Outcomes:

After completion of the course student will be able to:

CO1 Comprehend of the Power of Numerical Techniques, and Ideas.

CO2 Apply these techniques to problems drawn from Industry, Management and other engineering fields.

CO3 Demonstrate the ability to solve linear system of equations.

CO4 Solve various problem of linear and nonlinear differential equations by using numerical methods.

Text Books

1. Numerical Methods in Engineering and Science: (C, and C++, and MATLAB), B. S. Grewal, Khanna Publication
2. Jain, M. K & Iyengar. S.R.K, numerical method for scientific and engineering computation, 3rd edition, New Age Publishers

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester IV

Course Title: Signals & Systems | **Max Marks: 100**
Course Code: PCC-ECE-421 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The objective of this course is to study and analyse the characteristics of continuous and discrete signals and systems**.**

Unit-I

Introduction: Definitions of a signal and a system, classification of signals, elementary signals, and basic Operations on signals, Systems viewed as Interconnections of operations, properties of systems.

Unit-II

Time-domain representations for LTI systems: Convolution and its significance, impulse response representation, Convolution Sum and Convolution Integral. Relationship between LTI system properties and the impulse response i.e., Causality, Stability, Step response.

Unit-III

Fourier representation for signals: Fourier representation for signals, Continuous -time Fourier series and their properties, Application of Fourier Series to LTI systems, Continuous –time Fourier Transform & its properties, Applications of Fourier Transform to LTI systems, Fourier transform of periodic signals, Discrete-time Fourier Transform and its properties, Relationship of Fourier Transform to other transforms.

Unit-IV

Laplace Transforms–1: Introduction, Laplace transform, ROC and its properties, properties of Laplace transforms, inverse Laplace transform using partial fraction method. Transform analysis of LTI Systems, unilateral Laplace Transform and its application to solve differential equations. Initial and final value theorems, Poles and Zeros of a system.

Unit-V

The Z Transform: Z-Transform- Unilateral and Bilateral, Region of convergence; Properties of the Z-transform; inverse Laplace transforms using long division and partial fraction method. Transform analysis of LTI Systems, Unilateral Z-transform and its application to difference equations with zero and non-zero initial condition. Block diagram representation in Z-Domain.

Course Outcomes:

After completion of the course student will be able to:

CO1. Represent different Signals in mathematical form and apply basic operations on Signals. Also, Student's must know physical significance of various elementary signals.

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CO2. Classify systems based on their properties and determine the response of LTI system using convolution.

CO3. Represent Signals in frequency domain i.e. Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.

CO4. Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.

Text Books:

1. **Simon Haykin and Barry Van Veen,** "Signals and Systems", Wiley & Sons, 2001.Reprint 2002.
2. **B. P. Lathi,** "Linear Systems and Signals", Oxford University Press, 2005.

Reference Books:

1. **V. Oppenheim Alan,** Signals and Systems, PHI, 2nd Ed., 1997
2. **H. P Hsu, R. Ranjan,** "Signals and Systems", Scham's outlines, TMH, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester IV

Course Title: Linear Control Systems | **Max Marks: 100**
Course Code: PCC-ECE-422 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course puts an emphasis on the Linear control systems. The course content has been designed to give a practical shape to the basic courses.

Unit–I

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models: Differential equations, Impulse Response and transfer functions. Block diagram representation of systems, Reduction using Block diagram algebra, Representation by Signal flow graph, Reduction using mason's gain formula.

Unit-II

Time Response Analysis: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems, Time domain specifications, Steady state response, Steady state errors, PID Controllers.

Unit-III

Stability Analysis in S-Domain: The concept of stability - Routh stability criterion – qualitative stability and conditional stability. **Root Locus Technique:** The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

Unit-IV

Frequency Response Analysis: Introduction, Frequency domain Specifications-Bode Diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain Margin-Stability Analysis from Bode Plots. **Stability Analysis in Frequency Domain:** Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability.

Unit-V

Introduction to State variable analysis: Concepts of state, state variable and state models for electrical systems, Solution of state equations.

Course Outcomes:

After completion of the course student will be able to:

CO1. Define concept of control systems & analyze characteristics equation as well as mathematical models.

CO2. Plot the time response of different control systems and explain PID controllers.

CO3. Analyze the different stability scheme in S-Domain and plot root- locus of control systems.

CO4. Perform stability analysis in frequency domain using different techniques.

CO5. Solve control system using state space equations.

Text Books:

1. **Nise S-** Control Systems engineering 4th edition John Wiley and son's.
2. **Ogata Katsuhiko**- Modern Control Engineering Prentice Hall of India Pvt. Ltd., 3rd edition.

Reference Books:

1. **Magrath. J and Gopal M**- Control Systems Engineering –New Age International (P) Limited Publishers, 2nd edition.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester IV

Course Title: Analog Communication Systems **Max Marks: 100**
Course Code: PCC-ECE-423 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The main thrust in this course is on making students familiar with basic communication principles and Technologies in vogue. The stress is on the applied Communication with reference to the relevant technologies.

Unit-I

Introduction to communication systems: Elements of an Analog Communication System, Communication Media and their Characteristics, channel capacity, Bandwidth, Shannon Capacity Relationship. Concept of time domain and frequency domain representation of signals. Fourier series expansion and Fourier Transform of some fundamental Signals.

Unit-II

Amplitude Modulation (AM): Concept of Modulation, Need for modulation, Amplitude modulation, Frequency spectrum of AM Waves, Representations of AM waves, Power relation in AM waves, Types of AM- Double sideband techniques and Single Sideband Techniques. SSB generation and Detection, DSB Generation and Detection, Numerical on Power calculations and Spectral analysis of AM.

Unit-III

Frequency Modulation (FM): Concept of Angle Modulation, Introduction to FM, Expression for Monotone FM, Types of FM, Power relations in FM, Spectrum of wideband FM, Bandwidth calculation in FM, Generation Methods of FM- Direct and Indirect, Detection methods of FM signal, PLL as FM detector. Numerical on power calculations, Bandwidth calculations and Spectral analysis of FM.

Unit-IV

Radio Transmitters and Receivers: Block Diagram of AM/FM radio Transmitter, Characteristics of Radio receivers- Sensitivity, Selectivity, Fidelity, Image Rejection (IFRR), Block Diagram for TRF Radio Receiver and Super-Heterodyne Receiver, ACG Controller and its configurations.

Unit-V

Noise analysis: Source of noise in analog communication systems, classification of noise - external noise, internal noise, Noise figure, signal to noise ratio (SNR), SNR and noise figure calculation in AM/FM systems, Concept of Pre-emphasis & De-emphasis. Numerical on noise and SNR calculations

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Characterize different components of communication systems and find time domain and frequency domain representation of different signals.
- **CO2.** Apply concept of modulation and carry out power calculations & spectral analysis of AM wave.
- **CO3.** Carry out power calculations, Bandwidth calculations and Spectral analysis of FM wave.
- **CO4.** Calculate Noise figure, signal to noise ratio (SNR) in AM/FM systems and analyze different noises present in communication systems.

Text Books:

1. **Taub and Schilling**, Principles of communication systems, TMH
2. **Simon Haykin**, Communication Systems, John Wiley & Sons.

Reference Books:

1. **Roddy and Coolen**, Electronic comm., PHI, New Delhi, 4th Edition, 2003.
2. **Bruce Carlson et al**, Comm. systems, McGraw Hill Int., 4th Ed., 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester IV

Course Title: Linear Integrated circuits & Pulse Switching | **Max Marks: 100**
Course Code: PCC-ECE-424 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of OPAMP based linear and Non-linear circuits and different wave shaping circuits.

Unit-I

Op-Amplifier Fundamentals:

Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features,Basic Op -Amp circuit, Op-Amp parameters – Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate and Frequency limitations; Biasing of Op-Amps.

Unit-II

Linear and Non-Linear applications of OP-Amps:

Linear applications:-Voltage Followers, Non-inverting & Inverting amplifiers, Summing amplifiers, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters.

Non-Linear applications:-Basic comparator & its characteristics, zero crossing detector, Inverting and non-inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

Unit-III

Active Filters and Oscillators

Filters:-Butterworth Filters Low pass filter, High pass filter, Band-Pass Filters, Band Reject Filters, All-Pass Filters.

Oscillators:- Phase Shift Oscillator, Wien Bridge Oscillator, Voltage-Controlled Oscillator(VCO)

Unit-IV

Switching and waveshaping circuits: Linear wave shaping circuits: High Pass circuits, Low pass circuits, Differentiator, Integrator, RLC circuits, Ringing circuits. Clamping Theorem. **Time- base Generators:** Time- base Generators, Methods of generating a time –base waveform, exponential sweep circuit, sweep circuit using UJT, sweep circuit using a transistor switch, Miller and Bootstrap time base generators-basic principles.

Unit-V

Timers, Blocking Oscillators & Phase Locked Loops: Introduction to 555 timer- its applications as Monostable and Astable multivibrators, Linear voltage regulators- protection mechanism- LM 723 functional diagram, functional operation of 78xx series IC and design of fixed and adjustable regulators. Blocking- Oscillator, Astable transistor blocking oscillator (Diode-controlled and RC-

controlled), Application of blocking oscillator. Phase Locked Loop, frequency multiplication, frequency translation.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Solve Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate of op-amps.
- **CO2.** analyze and design Voltage Followers, Non-inverting & Inverting amplifiers, Summing amplifiers, Instrumentation amplifier, AC amplifier, V to I, I to V converters using Op-Amps
- **CO3.** Analyze and design zero crossing detector, Inverting and non-inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers using Op-amps
- **CO4.** Analyze Time- base Generators, Timers, Blocking Oscillator and Phase Locked Loops

Text Books:

1. C**howdhury D. Roy**, Linear Integrated Circuits, New Age International (p) Ltd, 2nd Ed., 2003.
2. **Ramakant A. Gayakwad**, 'OP-AMP and Linear IC's', Prentice Hal, 1999.

Reference Books:

1. Sergio Franco, 'Design with operational amplifiers and analog integrated circuits', McGraw-Hill, 2002
2. **Coughlin R.F. & Driscoll Fredrick**- Operational Amplifiers & Linear Integrated Circuits, PHI.
3. **J. Michael Jacob**, 'Applications and Design with Analog Integrated Circuits', Prentice Hall of India, 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester IV

Course Title: Data Communication & Computer Networks **Max Marks: 100**
Course Code: PCC-ECE-425 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Introduction: Data Communications, Networks, Protocols and Standards, Network models: OSI model, TCP/IP Protocol suite, Addresses.

Unit-II

Data Transmission: Concepts and Terminology, Analog and digital data Transmission, Transmission Impairment, Channel Capacity and performance, Transmission media: guided, unguided.

Unit-III

Data link Layer: Design issues of Data Link layer, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, SLIP, Data link layer in HDLC, Contention based media access protocols (ALOHA, Slotted ALOHA, CSMA and CSMA/CD) MAC addresses.

Unit-IV

Network Layer: Logical addressing, Internet protocols: Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6, Internet control protocols (ICMP, ARP, RARP)

Unit-V

Network Layer: Delivery, Forwarding, Forwarding Techniques and Processes, Routing Table, Unicast Routing Protocols: Distance Vector and Link state routing, Path Vector Routing; Multicast Routing Protocols.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the fundamental concepts of Data Communication.
- **CO2.** Understand and explain digital transmission over different types of communication media.
- **CO3.** Understand the principles of framing, flow control, error control and access control mechanisms.
- **CO4.** Understand the concept of logical addressing and building the skills of sub-netting.
- **CO5.** Understand and explain the principles and protocols for route calculations.

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Text Books:

1. **Behrouz A. Forouzan**, "Data Communication and Networking", McGraw Hill, 4th Edition.
2. **Tanenbaum A S**, "Computer Networks", 4th Edition, Prentice Hall.

Reference Books:

1. **Micheal A. Gallo, William M. Hancock** - Computer Communications & Networking Technologies, Cengage India.
2. **Larry L. Peterson and Bruce S. Davie -** Computer Networks: A systems approach, Morgan Kaufman, 2nd Edition.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester IV

Course Title: Signal and System Lab | **Max Marks: 50**
Course Code: PCC-ECE-431 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Generation of impulse, step, sinusoidal, exponential Signals (both continuous & discrete)
2. Linear convolution, auto correlation & cross correlation of two sequences.
3. Sampling and effect of aliasing
4. Impulse and Step response of 1st & 2nd order systems
5. Fourier transform of various signals
6. Laplace transform of various signals
7. Application of Laplace to solve differential equations and analysis of electric circuits.
8. Z- transform of various signals
9. Applications of Z- transform to solve difference equations and its application.

Course Outcomes:

After completion of the course student will be able to:

CO1. Generate continuous as well as discrete signals such as impulse, step, ramp, etc.
CO2. Apply Fourier, Laplace & Z transforms on two signals and analyze the results obtained from each
CO3. Solve differential equations and analysis of electric circuits by applying Laplace Transform
CO4. Solve difference equations by applying Z transform.
CO5. Function effectively as a team.

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Semester IV

Course Title: Analog Communication Systems Lab | **Max Marks: 50**
Course Code: PCC-ECE-432 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. To simulate AM models for modulation and detection
2. To simulate FM models for modulation and detection
3. Experimental setup for DSB-AM
4. Experimental setup for SSB-AM
5. Study of Sampling and reconstruction techniques
6. Study of various multiplexing methods
7. Study of AM/FM Transmitter and Receiver.

Course Outcomes:

After completion of the course student will be able to:

CO1. Simulate amplitude modulated wave, DSB-SC, SSB-SC wave by selecting different frequencies for carrier wave and modulating wave.

CO2. Simulate PWM, PAM, PPM modulation and de-modulation and thereby can analyze their characteristics.

CO3. Compare frequency response of 2^{nd} order and 4^{th} order Butterworth low pass filter

CO4. Apply Nyquist theorem and thereby analyze the phenomena of aliasing.

CO5. Function effectively as a team.

Semester IV

Course Title: Linear Integrated Circuits Lab **Max Marks: 50**
Course Code: PCC-ECE-433 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Study of OP AMPs – IC 741, IC 555, – Functioning, Parameters and Specifications.
2. To demonstrate the relationship between input and output for the inverting and non-inverting configuration of the Op-Amp 741
3. To perform the Application operation – Adder, Subtractor, Comparator Circuits using IC741.
4. To design a square wave and triangular wave generator using Op-amp's.
5. Active Filter Applications – LPF, HPF (first order & 2^{nd} order)
6. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
7. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
8. IC 555 Timer – Monostable Operation Circuit.
9. IC 555 Timer – Astable Operation Circuit.
10. Schmitt Trigger Circuits – using IC 741 and IC 555.
11. IC 565 – PLL Applications.

Course Outcomes:

After completion of the course student will be able to:

CO1. Establish relationship between input and output for the inverting and non-invertingconfiguration of the Op-Amp 741
CO2. Perform arithmetic operation using IC-741
CO3. Design 1^{st} order and 2^{nd} order active filters using IC-741
CO4. Implement Schmitt trigger circuits using IC-741 & IC-555
CO5. Design square wave and triangular wave generators using op-amps

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Semester – V

Semester V

Course Title: Microprocessor and Interfacing | **Max Marks: 100**
Course Code: PCC-ECE-521 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The objective of this course is to introduce to the students the fundamental of 8085 and 8086 microprocessors and their interfacing.

Unit-I

Introduction to 8085: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

8085 Assembly Language Programming and Interrupts: Assembly language programming in 8085, Microprocessor timings, Machine cycles, T states, Timing diagram for different machine cycles. Interrupts in 8085, RST instructions, multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts

Unit-III

8085 Interfacing: Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA Controller. Interfacing of memory, keyboard, LED and seven segment displays with 8085.

Unit-IV

8086 Microprocessor: Overview of 8086 features, architecture of 8086: execution unit and bus interface unit, flags and general purpose register, 8086 pin diagram, Memory segmentation, Minimum and Maximum mode operation, Memory Interfacing.

Unit-V

8086 Assembly Language Programming and Interrupts: 8086 addressing modes, instruction set, assembler directives, macros. Assembly language programming involving arithmetic, logical, branch & call instructions, string manipulations. 8086 interrupts.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Describe the various architectural aspects of 8085 Microprocessor.
- **CO2.** Understand 8085 interrupt phenomenon, timing diagram and write basic assembly language programs

CO3. Elaborate the synchronous and asynchronous data transfer and Direct Memory Access in 8085 and interfacing of 8085 with external devices.

CO4. Describe the various architectural aspects of 8086 Microprocessor.

CO5. Understand the interrupt phenomenon and write basic assembly language programming in 8086

Text Books:

1. **R. S. Gaonkar**, Microprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.
2. **A.K. Ray and K.M. Bhurchandi**, "Advanced Microrprocessors and Peripherals," TMH, 2000.

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: Digital Communication Systems **Max Marks: 100**
Course Code: PCC-ECE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Unit-I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling of analog signals, Quantization, Quantization error, signal to noise ratio due to Quantization, PCM Coding, Companding in PCM systems. Differential PCM systems (DPCM). BW of PCM. Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM DM systems and DPCM.

Unit-II

Line Coding Schemes: Basic definition, requirements of line coding schemes, different line coding techniques like NRZ (unipolar and bipolar), RZ, Manchester, Alternate mark and Inversion, HDBn, B8ZS, 4B/5B etc. coding schemes. Their properties and advantages.

Unit-III

Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, QAM, similarity of BFSK and BPSK, Constellation Diagram.

Unit-IV

Performance of Digital Communication Systems: Concept of noise, Various Noise types ,Additive white Gaussian noise, Bandlimited AWGN, probability of error coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

Unit-V

Spread Spectrum Modulation: Basic definitions of spread spectrum, advantages, Signal space Dimensionality and processing gain-Probability of error, Frequency hop spread spectrum - pseudo-noise sequences – Direct sequence spread spectrum with coherent binary phase shift keying – problem in spread spectrum systems.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand different pulse digital modulations and their advantages, disadvantages.
- **CO2.** Understand different line coding techniques and their properties.
- **CO3.** Differentiate between various digital modulation techniques and their advantages & disadvantages.
- **CO4.** Know about white Gaussian noise, mathematical modelling for different types of filters used to reduce noises in communication system.
- **CO5.** Understand different spread spectrum techniques.

Text Books:

1. Simon Haykin, Digital communications, John Wiley, 2005
2. H. Taub and D. Schilling, Principles of Communication Systems, TMH, 2003

Reference Books:

1. Sam Shanmugam, Digital and Analog Communication Systems, John Wiley, 2005
2. John Proakis, Digital Communications TMH, 1983
3. Singh & Sapre, Communication Systems Analog & Digital TMH, 2004

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4. B.P. Lathi, Modern Analog & Digital Communication Oxford reprint,

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: Electromagnetic Wave Theory | **Max. Marks:100**
Course Code: PCC-ECE-523 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to acquaint the students with basic concepts of Electromagnetic theory.

Unit-I

Vector Calculus: Review of vector analysis, Scalar & vector products, gradient, divergence and curl of a vector, Rectangular, Cylindrical and Spherical co-ordinate system, Transformation amongst rectangular, cylindrical and spherical co-ordinate system.

Unit-II

Electrostatics: Coulomb's law, application of coulombs law, electric field intensity from point charges, field due to continuous distribution of charges, gauss's law, application of gauss's law, Electric displacement and displacement density potential function, potential field of a point charge, Laplace's and Poison's equations, Divergence Theorem, Boundary conditions at electric interface.

Unit-III

Magnetostatics: Magnetic field intensity and magneto motive force, Ampere's Circuital law, applications of ampere's circuital law, Biot-savart law and its application, vector potential, magnetic dipole. Ampere's work law in differential vector form, continuity of currents, conduction and displacement current, Strokes Theorem , Boundary conditions at the magnetic interface.

Unit-IV

Time Varying Fields: Faradays law, Maxwell's equations (Differential, Integral and Phasor forms). Uniform plane waves. Representation of wave motion in free space, perfect dielectrics and Lossy dielectrics (Wave equations). Pointing Theorem and Power density. Propagation in good conductor and Skin effect. Reflection of Uniform plane waves.

Unit-V

Introduction To Transmission Line and Wave Guides: Introduction, Circuit representation of parallel plane transmission lines, Transmission lines with losses, Characteristic impedance, Characteristic impedance at radio frequencies, Propagation constant, Attenuation constant and phase constant, Waves between parallel plane, Transverse Electric wave, Transverse magnetic waves; characteristics of TE & TM waves; velocity of propagation; Attenuation in parallel plane guides; wave impedance.

Course Outcomes:

After completion of the course student will be able to:

CO1. Apply vector calculus to static electric-magnetic fields in different engineering situations

CO2. To understand behaviour of Electric field.
CO3. To understand behaviour of Magnetic field.
CO4. Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.
CO5. Analyze the nature of electromagnetic wave propagation in guided medium.

Text Books:

1. **Hayt W.**, Engineering Electromagnetics, TMH. (5^{th} or 7^{th} edition).
2. **Prasad K. D.**, Antenna and Wave Propagation, Satya Prakashan.

Reference Books:

1. **Guru & Hizirogli**, Electromagnetic field theory fundamental, Thomson Publication.
2. **Kraus J. D.**, Electromagnetics, TMH, 4^{th} Edition.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester V

Course Title: Computer Organization & Architecture **Max Marks: 100**
Course Code: PCC-ECE-524 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objectives: To understand the basic hardware and software issues of computer organization and understand the representation of data at the machine level.

Unit-I

Introduction, Technologies for building Processors and Memory, Performance, The Power Wall, Operations of the Computer Hardware, Operands Signed and Unsigned numbers, Representing Instructions, Logical Operations, Instructions for Making Decisions

Unit-II

MIPS Addressing for 32-Bit Immediates and Addresses, Parallelism and Instructions: Synchronization, Translating and Starting a Program, Addition, and Subtraction, Multiplication, Division, Floating Point, Parallelism and Computer Arithmetic: Subword Parallelism.

Unit-III

The Processor: Logic Design Conventions, Building a Datapath, A Simple Implementation Scheme, overview of Pipelining, Pipelined Datapath, Data Hazards: Forwarding versus Stalling, Control Hazards, Exceptions, Parallelism via Instructions.

Unit-IV

Memory Technologies, Basics of Caches, Measuring and Improving Cache Performance, dependable memory hierarchy, Virtual Machines, Virtual Memory,Using FSM to Control a Simple Cache, Parallelism and Memory Hierarchy: RedundantArrays of Inexpensive Disks, Advanced Material: Implementing Cache Controllers

Unit-V

Parallel processing architectures and challenges, Hardware multithreading, Multicore and shared memory multiprocessors, Introduction to Graphics Processing Units, Clusters and Warehouse scale computers, Introduction to Multiprocessor network topologies.

Course Outcomes:

After completion of the course student will be able to:

CO1. Ability to analyze the abstraction of various components of a computer.
CO2. Ability to analyze the hardware and software issues and the interfacing.
CO3. Understand control unit operations.
CO4. Understand memory hierarchy and its impact on performance and cost.
CO5. Understand the concept of I/O organization.

Text Books:

1. **David A. Patterson and John L. Hennessey, Computer Organization and Design, Fifth edition, Morgan Kauffman / Elsevier, 2014.Morris Mano**, Computer system Architecture, PHI.

Reference Books:

1. **V. Carl Hamacher, Zvonko G. Varanesic, and Safat G. Zaky**, "Computer Organization", 6th edition, McGraw-Hill Inc, 2012.
2. **William Stallings**, "Computer Organization and Architecture", 8th Edition, Pearson Education, 2010

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester V

Course Title: Microprocessor & Interfacing Lab | **Max Marks: 50**
Course Code: PCC-ECE-531 | **University Exam: 25**
Duration of Exam: 3 hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Study of 8085 and 8086 Microprocessor Kit.
2. Write a program to add and subtract two 8-bit and 16-bit number using 8085.
3. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8085.
4. Write a program to generate Fibonacci series using 8085.
5. Write a program to sort series using bubble sort algorithm using 8085.
6. To find the largest signed number in a given series of data using 8085.
7. To copy a block of data from one memory to another using 8085.
8. Write a program to add and subtract two 8-bit and 16-bit number using 8086.
9. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8086.
10. Write a program to generate Fibonacci series using 8086.
11. Write a program to sort series using bubble sort algorithm using 8086.
12. To find the largest signed number in a given series of data using 8086.
13. To copy a block of data from one memory to another using 8086.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the various features of 8085 and 8086 microprocessor kits.
CO2. Write various arithmetic and logical based assembly language programs in 8085 and 8086.
CO3. Write various string manipulation based assembly language programs in 8085 and 8086.
CO4. Write basic data transfer programs using 8085 and 8086.
CO5. Function effectively as a team.

Semester V

Course Title: Digital Communication Systems Lab | **Max Marks: 50**
Course Code: PCC-ECE-532 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Study of Differential phase shift keying. Study of Various Keying Techniques
2. Study of Pulse Width Modulation and demodulation.
3. Study of Pulse Position Modulation and demodulation.
4. Pulse code modulation.
5. Study of Differential pulse code modulation.
6. Study of Delta modulation.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand basic theories of Digital communication system in practical.
CO2. Understand sampling theorem and modulation techniques in practical.
CO3. Design and implement different modulation and demodulation technique.
CO4. Analyze modulation techniques using MATLAB tool.
CO5. Function effectively as a team.

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Semester V

Course Title: PCB and Project Lab | **Max Marks: 50**
Course Code: PCC-ECE-533 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. To create & simulate circuit using TINAPRO.
2. Design a clipper and clamper circuits using TINAPRO
3. Design a PCB layout for Half Wave Rectifier Circuit using TINA software.
4. Design a PCB layout for Full Wave Rectifier Circuit using TINA software.
5. To design & develop PCB for a Bridge circuit.
6. Design a PCB layout for 555 timer based Astable multivibrator Circuit using TINA software.
7. Development of PCB for emitter follower circuit in hardware Lab
8. Development of PCB for 5V power supply in hardware lab.
9. Develop a PCB for 555 timer based small project.
10. To generate discrete Logic PCB designs.

Course Outcomes:

After completion of the course student will be able to:

CO1. Design & simulate schematic for simple circuits using Electronic Design Automation (EDA) Tools.
CO2. Design PCB layout for simple circuits using Electronic Design Automation (EDA) Tools.
CO3. Understand the need for PCB Design and steps involved in PCB Design and Fabrication process.
CO4. Design (schematic and layout) PCB for projects.
CO5. Understand discrete logic PCB designs.

Semester – VI

Semester VI

Course Title: Digital Signal Processing | **Max Marks: 100**
Course Code: PCC-ECE-621 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Signals and Systems: Basic elements of DSP, Concept of frequency in Analog and Digital Signals,Sampling theorem, Discrete time signals, Systems, Analysis of discrete time LTI systems.

Unit-II

The Discrete Fourier Transform: Discrete Fourier transform (DFT), Properties of DFT: Periodicity, Linearity and Symmetry, Multiplication of two DFT's and Circular Convolution, Efficient Computation of the DFT: Computational complexity, FFT algorithms: Decimation-in-time and decimation-in-frequency.

Unit-III

Design of Digital IIR Filters: Discrete time IIR Filter from Analog Filter, IIR Filter Design: by Impulse Invariance, Bilinear Transformation, Approximation of derivatives (LPF, HPF, BPF), Structure for IIR Systems: Direct-Form Structures, Signal Flow Graphs and Transposed Structures,Cascade-Form Structures, Structures, Parallel-Form Structures.

Unit-IV

Design of Digital FIR Filters: Design of FIR Filters, Symmetric and Antisymmetric FIR Filters, Design of Linear-Phase FIR Filters: Using Windows (Rectangular Window, Hamming Window, Hanning Window) and by the Frequency-Sampling Method. Structures for FIR Systems: Direct- form structures, Cascade-form Structures.

Unit-V

Finite Word Length Effects in Digital Filters: Binary fixed point and floating point number representations. Quantization noise, Truncation and rounding, Quantization noise power, Input quantization error, Coefficient quantization error.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic concepts of Discrete Fourier transform and its application to linear filtering.
- **CO2.** Understand and explain FFT algorithms and their computational efficiency in comparison to DFT.

CO3. Understand and explain the design of IIR filters by approximation of derivatives, impulse invariance and bilinear transformation.

CO4. Understand and explain the design of FIR filters by windowing and frequency sampling technique and provide a basic overview of special type of FIR filters.

CO5. Understand and explain the realization of filters using cascade and parallel structures as well as signal flow graphs and provide brief overview of the application areas of DSP.

Text Books:

1. **J. G. Proakis and D. G. Manolakis**: DSP, 3rd Edition, Pearson Education, 2007.
2. **Johnny Johnson**: Digital Signal Processing, 3rd Edition, PHI.

Reference Books:

1. **Emmanuel C. Ifeachor, and Barrie. W. Jervis,** "Digital Signal Processing", 2nd Edition, Pearson Education, Prentice Hall, 2002.
2. **Sanjit K. Mitra**, "Digital Signal Processing-A Computer Based Approach" TMH, 2007.
3. **A. Oppenheim,** R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Person, 2004.
4. **Andreas Antoniou,** "Digital Signal Processing", Tata McGraw Hill, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Micro-Controller and Embedded Systems **Max Marks: 100**
Course Code: PCC-ECE-622 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Unit-I

8051 Microcontroller: Overview of Embedded System Architecture, Application areas, Categories of embedded systems, specialties of embedded systems, Microcontrollers for embedded systems, Overview and Architecture of 8051, Internal Memory organization. AMBA (Advanced Microcontroller Bus Architecture)

Unit-II

Assembly Language Programming of 8051: Data manipulation within registers, Jump, Loop and Call Instructions, I/O Port programming, Addressing Modes, Arithmetic, Logic Instructions.

Unit-III

Timer and Serial Port and Interrupts Programming: 8051 Timers and counters, Timer programming, Time delay using timers, Counter programming, Serial Port communication, and programming, Interrupts programming.

Unit-IV

8051 Interfacing: 8051 Hardware connections, LCD and Keyboard Interfacing, ADC, DAC and Sensor Interfacing, Motor control: Relay, PWM, DC, and Stepper motors. External memory interfacing.

Unit-V

AVR microcontroller: History and features, AVR architecture, Assembly Language Programming, Branch Call and Time delay Loop, I/O port programming, Arithmetic, and Logic Instructions and Programs.

Course outcomes:

After completion of the course student will be able to:

- **CO1**. Understand basic structure embedded systems.
- **CO2.** Analyze the data transfer information through serial & parallel ports.
- **CO3.** Design different interfacing applications using microcontrollers and peripherals.
- **CO4**. Develop real-time software and hardware for embedded systems using AVR Microcontroller.
- **CO5.** Utilize microcontroller knowledge in minor projects to solve real-life problems.

Text Books:

1. **M. A. Mazidi, J. G. Mazidi, R. D. McKinlay The 8051 microcontroller & Embedded systems, Pearson.**
2. **M. Ali Mazidi, Sarmad Naimi and Sepehr Naimi, The AVR Microcontroller and Embedded Systems Using Assembly and C, By, Pearson Education.**

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Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester VI

Course Title: Antenna and Wave Propagation **Max Marks: 100**
Course Code: PCC-ECE-623 **University Exams: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to antenna field. Emphasis is given to latest technologies and recent trends.

Unit-I

Introduction to Antennas: Radiation Fundamental, Retarded Potential, induction and radiation fields, radiated power from a current element, short antennas, Radiation from a quarter wave monopole and half wave dipole.

Unit-II

Fundamentals of Antennas & Arrays of Antennas: Basic ideas of reciprocity properties of antennas, Radiation resistance, Radiation patterns, directional properties of dipole antennas. Antenna gain, Antenna aperture and its relation to gain, antenna terminal impedance, Antenna temperature and signal to noise ratio.

Antenna Arrays -Arrays of two point sources, linear arrays of n-point sources. Broadside and end fire arrays, pattern multiplication, effect of earth on vertical and horizontal patterns, Binomial array.

Unit-III

Special Purpose Antennas -Reflector type antennas, Lens antenna, V and Rhombic antennas, Yagi antenna, slotted and horn antennas, microstrip antennas. Antenna designs for radar applications (Search Radar, Tracking Radar and Imaging Radar)

Unit-IV

Ground Wave Propagation, Basic ideas of ground wave, propagation, reflection at the surface of conducting plane earth ,space and surface waves, tilt of the surface wave, troposphere waves-reflection, refraction, duct propagation.

Unit-V

Ionosphere Propagation: The ionosphere, formation of the various layers, their effective characteristics, reflection and refraction of waves by ionosphere, virtual height, maximum usable frequency(MUF), lowest Usable frequency(LUF), skip distance, regular and irregular variation of ionosphere, ordinary and extraordinary waves.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the important and fundamental antenna parameters and terminology.
- **CO2.** Explain the working of antennas and formation of antenna patterns for different cases.

CO3. Explain loop, slot, patch and horn antennas. Derive expressions for the parameters of loop and slot antennas.

CO4. Explain ionosphere and troposphere propagation.

CO5. Develop the basic skills for designing a wide variety of practical antennas and antenna arrays.

Text Books:

1. **Prasad K. D -** Antenna and Wave Propagation, Satya Prakashan.
2. **Jorden F.C. & Balmann B.C**-Electromagnetic waves & radiating System, PHI.

Reference Books:

1. **Kraus J.D,** Antennas, McGraw Hill.
2. **Rao Narayan** - Basic Electromagnetics with application, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Digital Signal Processing Lab | **Max Marks: 50**
Course Code: PCC-ECE-631 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: Credits: 1 [0-0-2]

List of Experiments

USING MATLAB

1. Generation of Signals
2. Linear and circular convolution of two sequences
3. Sampling and effect of aliasing
4. Design of FIR filters
5. Design of IIR filters
6. Calculation of FFT of a signal

USING TMS320C5X

1. Study of various addressing modes of DSP using simple programming examples
2. Sampling of input signal and display
3. Implementation of FIR filter
4. Calculation of FFT

Course Outcomes:

After completion of the course student will be able to:

CO1. Analyze basic signals using MATLAB.
CO2. Carry out linear and circular convolution of different signals.
CO3. Carry out DFT and FFT of various signals.
CO4. Design FIR and IIR filters using various techniques.
CO5. Function effectively as a team.

Semester VI

Course Title: Micro-Controller and Embedded Systems Lab | **Max Marks: 50**
Course Code: PCC-ECE-632 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: Credits: 1 [0-0-2]

List of Experiments

1. To study development tools/environment for 8051 microcontroller programs.
2. 8051 Data Transfer - Block move, Exchange, Sorting, Finding largest element in an array.
3. Arithmetic Instructions - Addition/subtraction, multiplication, and division, square, Cube – (16 bits Arithmetic operations – bit addressable).
4. 8051 I/O port Programming: bit manipulation Programming.
5. 8051 Timer Programming.
6. Serial port programming.
7. BCD to ASCII Conversion using 8051 and AVR
8. Delay programs for 8051 and AVR.
9. AVR I/O port programming.
10. 8051 and AVR interfacing with:
    a. LED
    b. LCD
    c. Keyboard
    d. ADC/DAC
    e. Sensor
11. Motor control: Relay, PWM, DC, and Stepper motor

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the working of 8051 and AVR with the help of Kiel IDE.
CO2. Perform Data transfer, Arithmetic, and Logical Operations.
CO3. Interface various devices with 8051 and AVR Microcontroller.
CO4. Develop embedded systems for real-world problems using 8051 and AVR Microcontroller.
CO5. Function effectively as a team.

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Semester VI

Course Title: Antenna Lab | **Max Marks: 50**
Course Code: PCC-ECE-633 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. Study of Simple Dipole (λ/2) antenna.
2. Study of Simple Dipole (λ/4) antenna
3. Study of Yagi-UDA 5 Element Simple dipole antenna
4. Study of Yagi -UDA 3 Element Folded dipole antenna
5. Study of Hertz antenna
6. Study of λ/2 Phase Array (End fire) antenna
7. Study of Broad Side Array antenna
8. Study of Log Periodic antenna
9. Study of Slot antenna
10. To perform Polarisation Test
11. Study of variation in the radiation strength at a given distance from the antenna
12. Study of the Reciprocity theorem for antennas

Course Outcomes:

After completion of the course student will be able to:

CO1. To understand the working of antenna
CO2. To understand the radiation pattern of various antenna
CO3. To develop understanding of polarization for antenna system
CO4. To understand radiation strength dependence with distance
CO5. To understand the principle of reciprocity and its significance in practical problems.

Semester – VII

Semester VII

Course Title: RF & Microwave Engineering **Max Marks: 100**
Course Code: PCC-ECE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles of high frequency signal propagation. Applied and Industrial Aspects have been taken care of in an appropriate manner.

UNIT- I

Two Port RF Networks-Circuit Representation: Introduction to transmission lines. Low frequency parameters-impedance, admittance, hybrid and ABCD. Introduction to component basics, wire, resistor, capacitor and inductor, applications of RF parameters, properties of S Parameters-Reciprocal and lossless networks, transmission matrix Relation of Z, Y and ABCD parameter with S-parameters.

UNIT-II

Microwave Tubes: Microwave Frequency Bands, General Applications of Microwaves, Advantages of Microwaves, UHF limitations in conventional tubes, Analysis and operation of multi-cavity and reflex, Klystron, admittance diagram of Klystron. Analysis and operation of a traveling wave Magnetron, Performance charts of Magnetron tubes; Principle of operation of Traveling Wave Tube.

UNIT-III

Microwave Semiconductor Devices: Classification of Microwave Devices. Tunnel diode, Gunn diode, two valley structures, mode of operation, circuit realization. IMPATT diode, TRAPATT diodes, BARITT diodes, circuit realization. PIN diode, basic principle of operation, equivalent circuit, and application as switch, modulator and phase shifter. Microwave Bi-polar and Field Effect Transistors-characteristics and performance. Parametric amplifiers.

UNIT-IV

Microwave Components: Coupling-probes and loops Apertures, Attenuators, phase shifters. Waveguide corners, bends and twists. Matched terminators, short circuit plunger, Waveguide Tees-E, H, hybrid. Hybrid rings. Directional coupler, two-hole directional coupler. Isolator, circulator.

UNIT-V

Microwave Measurements: Tunable detector, slotted line carriage. Measurement of VSWR and Reflection coefficient, impedance using slotted line. Use of Smith Chart. Impedance Matching, Double and Triple stub Tuners, Quarter wave Transformer. Measurement of frequency and wavelength. Measurement of Microwave power - low and high, use of bolometer, thermistors, calorimeter.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic concepts and principles of high frequency signal propagation with the importance of using s-parameter in microwave circuits.
- **CO2.** Know the demerits of vacuum tubes and their solution using cavity based klystron at microwave frequencies.
- **CO3.** Understand different solid state microwave devices with and their use in different microwave circuits.
- **CO4.** Understand the principle of operation of different passive waveguide components.
- **CO5.** Measure different parameters like frequency, VSWR, power etc. at microwave frequencies.

Text Books:

1. **Collin R E**, *"*Fundamentals of Microwave Engg.", McGraw- Hill.
2. **Liao S Y**, *"*Microwave Devices and Circuits*"*, Prentice Hall of India, (1995).

Reference Books:

1. **Das A and Das S K**, *"*Microwave Engineering*"* TMH.
2. **K C Gupta,** *"*Microwaves", New Age International, New Delhi, (1983).

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Entrepreneurship Development & Management **Max Marks: 100**
Course Code: HSMC-ECE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centers and Other supporting agencies.

Unit-III

Project Report Preparation: Identifying business opportunities, Project report and its importance, various contents of project report: managerial and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

Unit-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, Pricing strategies, Channel strategies and Promotional strategies.

Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation.

Introduction to Financial Management: source of finance and Working Capital management.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic development of entrepreneurship as a profession.
- **CO2.** Understand marketing strategies for any business enterprise.
- **CO3.** Acquire basic knowledge of human resource management for small business.
- **CO4.** Understand the social responsibilities of business managers.
- **CO5.** Know how to establish and manage a business enterprise.

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Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester VII

Course Title: Microwave Engineering Lab **Max Marks: 50**
Course Code: PCC-ECE-731 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Microwave Engineering Experiments

1. Study of microwave components and instruments.
2. Measurement of klystron characteristics.
3. Measurement of VSWR and standing wave ratio.
4. Measurement of Dielectric constants.
5. Measurement of Directivity and coupling coefficient of a directional coupler.
6. Measurement of Q of a cavity.
7. Calibration of the attenuation constant of an attenuator.
8. Determination of the phase-shift of a phase shifter.
9. Determination of the standing wave pattern on a transmission line and finding the length and position of the short circuit stub.

Course Outcomes:

After completion of the course student will be able to:

CO1. Analyze and explore different Microwave devices physically.
CO2. Perform microwave measurements with modern digital instruments such as spectrum analyzer using different techniques and with different microwave devices.
CO3. Analyze the performance of Microwave components.
CO4. To understand standing wave pattern for transmission line

Professional Electives1

Semester V

Course Title: Industrial Electronics **Max Marks: 100**
Course Code: PEC-ECE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

D.C. Motor Control: Control of DC motor using half controlled and fully-controlled single-phase and three-phase thyristor converters, control of DC motor using choppers of different configurations.

Unit-II

A.C. Motor Control: Stator voltage control of induction motors, control of induction motors using voltage source and current source inverters, slip-ring induction motor control.

Unit-III

Industrial circuits: Temperature control circuit, AC voltage regulators, fan regulators/ lamp dimmers, uninterrupted power supplies (UPS). Relays and Timers: The relay (basic construction), AC relay, Reed relay, Solid state relay, 555 timer and its industrial applications.

Unit-IV

Design of Printed Circuit Boards: Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

Unit-V

Industrial Appliances Design: Power Transformers and Voltage Stabilizers, Design of 0.5 and 1.0KVA Voltage Stabilizers, Design of Inverters and Battery Chargers for domestic use.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Control speed of DC motors.
- **CO2.** Control speed of AC motors.
- **CO3.** Gain knowledge of various Industrial Components.
- **CO4.** Understand PCB design rules. Design of PCB using computer aided tools.
- **CO5.** Design Power transformers, voltage stabilizer, inverter and battery charger.

Text Books:

1. **Mohan N Undeland, T.M. Robins, W.P**. "Power electronics- converters, application & design", John Wiley 1989
2. **Bose B.K**., "Power electronics and A.C Drives", Prentice Hail 1986.

Reference Books:

1. **Dubey G.K. Asarbada, E.R, K**., "Power electronics devices", IETE book, TMH.

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2. **Murphy J. M. D Turnnbull, F.G,** "Power electronics control of A.C motors".

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester V

Course Title: Electronic Multimedia Engineering | **Max Marks: 100**
Course Code: PEC-ECE-522 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies.

Unit-I

Electro-acoustical Transducers: A microphone, Types of microphones their polar frequency response: moving coil, crystal microphone, Ribbon microphone, Single button microphone, condenser microphone, Principle characteristics of microphone, Magnetic microphone, Transformer less microphones, MEMS microphones, Noise- suppressing microphones, Wireless microphones, Useful frequency range for microphones, Comparison of microphones, ,

Unit-II

Loudspeakers and Recording systems: Loudspeaker basics, performance factors, Types of Loudspeakers: Dynamic cone-type moving coil loudspeaker, Horn-type moving coil loudspeaker and Electrostatic type loudspeaker, multi way speaker systems: Cross over networks, Woofers, midrange and Tweeters, Baffles and enclosures, mounting of direct radiator loudspeakers. Earphones and hearing aids.

Unit-III

Recording: Video Cassette recorders, Video Tape characteristics, Tape recording and play back. Basic principal of video recording on Disc, Digital Video Disc (DVD): DVD technology, Disc and data details DVD Audio- DVD Video, Dolby digital sound, blue ray disc

Unit-IV

Display Fundamentals: Television basics, Composite video signal, Modulation requirement, TV standards requirement, NTSC and PAL colour system, Advanced DTH system, cable TV, IP TV in multimedia, digital TV- HD (High definition) display.

Unit-V

Principle of Vision and Application of Visual Properties: Luminance and Colour, response of eye, Colour representation, Video system characteristics, Function of digital Camera, charged coupled device (CCD), Principle and display application of LED, Liquid crystal and plasma devices, 3D display concept, Touch screen basics.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand and analyse various microphones and loudspeakers.
- **CO2.** Know the basic principle of recording and reproduction system like stereo recording and playback.
- **CO3.** Explain the modern digital systems like DVD, Dolby digital sound, Blue ray disc.
- **CO4.** Understand the basics of television standards and advanced HD TV and advanced DTH.
- **CO5.** Acquire knowledge about advanced digital cameras, LED display, 3D display and touch screen.

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Text Books:

1. **Ajay**- Dhanpat Rai & Sons Pub Audio Video and T.V Engineering.
2. **Gupta K.G-** Audio and Video Systems, Tata McGraw Hill Publication.

Reference Books:

1. **Kinsler**- Fundamentals of Acoustics, John Wiley & Sons. Inc.
2. **Walter Fischer**- Digital Video and Audio Broadcasting Technology, Springer Publication.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester V

Course Title: Smart Material Systems & MEMS **Max Marks: 100**
Course Code: PEC-ECE-523 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course is designed to introduce the concept of micro electro mechanical systems, enable students to learn the principles of MEMS fabrication, impart design principles of micro electro mechanical systems

Unit-I

MEMS: History of MEMS, Intrinsic Characteristics, Devices: Sensors and Actuators. Microfabrication: Photolithography, Thermal oxidation, Thin film deposition, etching types, Doping, Dicing, Bonding. Microelectronics fabrication process flow, Silicon based, Process selection and design.

Unit-II

Polymer MEMS & Microfluidics: Polymers in MEMS(Polyimide, SU-8,LCP,PDMS,PMMA,Parylene, Others) Polymers and their synthesis, UV radiation curing of polymers, Deposition techniques for polymer thin films, Properties and synthesis of carbon nanotubes

Unit-III

Sensors for Smart Systems: Introduction, Conductometric sensors, Capacitive sensors, Piezoelectric sensors, Magnetostrictive sensors, Piezo-resistive sensors, Optical sensors, Resonant sensors, Semiconductor-based sensors, Acoustic sensors, Polymeric sensors, Carbon nanotube sensors

Unit-IV

Actuators for Smart Systems: Introduction, Electrostatic transducers, Electromagnetic transducers, Electrodynamic transducers, Piezoelectric transducers, Electrostrictive transducers, Magnetostrictive transducers, Electro-thermal actuators, Comparison of actuation schemes

Unit-V

Case Studies: MEMS Magnetic actuators, BP sensors, Microphone, Acceleration sensors, Gyro, MEMS Product development: Performance, Accuracy, Repeatability, Reliability, Managing cost, Market uncertainties, Investment and competition

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** State the importance of miniaturized structure and importance of MEMS
- **CO2.** Outline step-wise processing of smart material systems
- **CO3.** Apply principles of different sensors and actuators for obtaining their MEMS models
- **CO4.** Sketch the fabrication & design considerations of commercial products

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Text Books:

1. **V. K. Varadan, K. J. Vinoy, S. Gopalakrishnan**, “Smart material systems and MEMS” Wiley India, 2011(Reprint).
2. **Chang Liu**, “Foundations of MEMS” Pearson, 2012.

Reference Books:

1. **Stephen D. Senturia**, "Microsystem Design", Kluwer Academic Publishers, 2001.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester V

Course Title: Engineering Material Science **Max Marks: 100**
Course Code: PEC-ECE-524 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: This course has been designed to get the student acquainted with the different types of materials, their crystal structure, their characterization techniques and their latest engineering applications.

Unit-I

Crystallography: crystal structure, Atomic Structure and Interatomic Bonding, Crystalline and Amorphous Solids, the 7 crystal systems, the 14 Bravais lattices, properties of cubic crystals: simple cubic, face-centered cubic, body-centered cubic and diamond cubic.

Unit-II

Classification of materials: Metals & Alloys, Ceramics, Polymers, Composites, Semiconductors. Smart materials, nano-materials, Biomaterials their molecular structure, properties and manufacture.

Unit-III

Characterization Techniques: Optical Microscope, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Field Ion Microscope (FIM), Scanning Tunneling Microscope (STM), Scanning probe microscopy (SPM), Atomic Force Microscope (AFM), X-ray diffraction topography (XRT).

Unit-IV

Micro and Nano fabrication: Processing of bulk, thin film and nano scale materials for applications in electronic, magnetic, electro-mechanical and photonic devices and micro systems. Growth of bulk, thin film and nano scale single crystals via vapor and liquid phase processes, epitaxy, formation and processing of thin films, their structures and properties.

Unit-V

Applications: Examples from materials processing for applications in photonic devices, MEMS, NEMS, Biomaterials and high performance integrated electronic circuits, integrated sensors and data storage systems.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic structures of Crystal, Atom & Interatomic Bonding
- **CO2.** Understand the various classifications of materials
- **CO3.** Understand various characterization Techniques like SEM, TEM etc.
- **CO4.** Understand the various fabrication techniques
- **CO5.** Understand the applications in MEMS, NEMS & Integrated Electronic Circuits

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Text Books:

1. **W. D. Callister, Jr.** Materials Science & Engineering- An Introduction, John Willey & Sons, Inc., New York.
2. **V Raghavan**, Materials Science & Engineering. Prentice Hall of India Pvt. Ltd., New Delhi.

Reference Books:

1. **L.H. Van Vlack**, "Elements of Materials Science & Engineering", Addison-Wesley Publishing Company, New York.
2. **J. W. Mayer and S. S. Lau**, Electronic Materials Science - Maxwell Macmillan International Editions, Singapore.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester V

Course Title: VLSI Design | **Max Marks: 100**
Course Code: PEC-ECE-525 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To familiarize students with various fundamental technologies required in VLSI design

Unit-I

Review of MOSFET: Constructional & Operational features of MOSFET, I-V Equation, 2ND Order Effects, MOS Capacitor, C-V Characteristics, MOSFET Switch, Transmission gate, CMOS Inverter (Pull-up & Pull-down), Inverter Static Characteristics, ßn/ ßp Ratio, Noise Margin, switching characteristics of Inverter (Fall Time, Rise Time, Delay Time), Dynamic Characteristics, Power Dissipation.

Unit-II

VLSI Technology: Wafer Processing, Oxidation, Epitaxy, Deposition, Ion-Implantation & Diffusion, The Silicon Gate Process, n-well CMOS Process, p-well Process, Twin-Tub Process, Silicon on Insulator.

Unit-III

CMOS Logic Design (Gates): CMOS Logic Gate Design (NAND & NOR Logic), Switching Characteristics (Delay Time, Power, Fan-in, Fan-out), Transistor Sizing, The Compound Gates.

Unit-IV

CMOS Logic Structures: CMOS Logic, Pseudo-nMOS Logic, Dynamic CMOS Logic, C2MOS Logic, BiCMOS Logic, NP Domino Logic.

Unit-V

Layout: Design Rules/Floor planning, Simple Layout Examples.

VHDL programming: Introduction and Design of simple circuits. (Examples: Address, Counters, Flip-Flops, FSM, Multiplexers/De-multiplexers). Introduction to Verilog, Top-Down and Bottom-Up Design Methodology, Design of Modules and Module Instances.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Describe the operational characteristics of MOSFET and its application as capacitor and switch.
- **CO2.** Design CMOS Inverters and analyze its static and dynamic characteristics
- **CO3.** Understand the complete CMOS fabrication process
- **CO4.** Design various CMOS based logic gates and logic structures
- **CO5.** Understand and draw the layout of basic CMOS based circuits.

Text Books:

1. **Weste & Eshraghian**-Principles of CMOS VLSI design (2/e) Addison Wesley.
2. **Samir Palnitkar-**Verilog HDL - Guide to Digital design and synthesis, 3rd edition, Pearson Education, 2003.

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Reference Books:

1. **M. J. S. Smith**- Application Specific integrated circuits, Pearson Education, 1997.
2. **Wayne Wolf**- Modern VLSI Design, Pearson Education 2003.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Professional Electives-2

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Semester VI

Course Title: Mobile and Wireless Communication **Max Marks: 100**
Course Code: PEC-ECE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies

Unit-I

Cellular Mobile Radio Systems: Introduction to Cellular Mobile System, evolution of mobile communication systems, Performance criteria, operation of cellular systems, The cellular Concept: Frequency reuse; The basic theory of hexagonal cell layout; Spectrum efficiency. FDM/TDM Cellular systems; Cell splitting and cell sectoring, hand off.

Unit-II

Interference: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, fading in mobile environment, inter symbol interference (ISI) and rejection using Near-Maximum Likelihood detection.

Unit-III

Wireless Communication: Major challenges in wireless communication, Radio propagation characteristics; Propagation mechanisms: Reflection, Diffraction and scattering, Effect of human made structures, phase difference between direct and reflected paths, Multipath propagation, Models for path loss, Shadowing and multipath fading (delay spread, coherence bandwidth, coherence time, Doppler spread).

Unit-IV

Multiple Access Techniques & Wireless Systems: Multiplexing techniques- FDMA, TDMA and CDMA. Spread spectrum systems: Frequency hopping multiple access and its principle, Code division multiple access-principle behind CDMA, Basic principle behind the Direct Sequence Spread Spectrum.

Unit-V:

OFDM and Multi antenna Systems: Introduction and Principle of OFDM, Orthogonality and its Physical significance, Implementation of transceivers, cyclic prefix, Advantages and disadvantages of OFDM, OFDMA. Smart Antennas, MIMO-Basic Introduction and system model.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system, formulate its performance criteria.
- **CO2.** Characterize the trade-off among frequency reuse, signal to interference ratio, capacity& able to understand interferences in cellular communication.
- **CO3.** Apply the knowledge of mathematics to find out the average received signal strength at a distance from the transmitter using different propagation model.
- **CO4.** Identify the advantages & disadvantages of different mobile antennas.

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CO5. Understand multiple access method, spread spectrum techniques, wireless communication system.

Text Books:

1. **Lee-** Mobile Cellular Telecommunications, McGraw Hill, 2nd Edition, 1989.
2. **Theodore, Rapport**-Wireless Communications Pearson education, 2nd Edition, 2002.

Reference Books:

1. **Blake R-** Wireless Communication Technology, Thompson Asia Pvt. Ltd., 2004.
2. **Mark Jon W and Weihua Zhqung -**Wireless Communication and Networking, PHI, 2005.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Satellite Communication | **Max. Marks: 100**
Course code: PEC-ECE-622 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To impart the technical knowledge about satellite services, link techniques and access techniques used in satellite signal propagation.

Unit-I

Orbital Parameters: Orbital parameters, Orbital perturbations, Geo stationary orbits, Low Earth and Medium orbits. Frequency selection, Frequency co-ordination and regulatory services, Sun transit outages, Limits of visibility, Attitude and orientation control, Spin stabilization techniques, Gimbal platform

Unit-II

Link Calculations: Space craft configuration, Payload and supporting subsystems, Satellite uplink -down link power budget, C/No, G/T, Noise temperature, System noise, Propagation factors, Rain and ice effects, Polarization calculations

Unit-III

Access Techniques: Modulation and Multiplexing: Voice, Data, Video, Analog and Digital transmission systems, multiple access techniques: FDMA, TDMA, T1-T2 carrier systems, SPADE, SS-TDMA, CDMA, Assignment Methods, Spread spectrum communication, Compression-Encryption and Decryption techniques

Unit-IV

Earth Station Parameters: Earth station location, propagation effects of ground, High power Transmitters-Klystron Crossed field devices, Cassegrania feeds, Measurements on G/T and Eb/No

Unit-V

Satellite Applications: INTELSAT Series, INSAT, VSAT, Remote sensing, Mobile satellite service: GSM. GPS, INMARSAT, Satellite Navigation System, Direct to Home service (DTH), Special services, E-mail, Video conferencing and Internet connectivity.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Explain the principles, concepts and operation of satellite communication systems.
- **CO2.** Describe the concepts of signal propagation affects, link design, rain fading and link availability and perform interference calculations.
- **CO3.** Understand modulation techniques and error correction codes for satellite communication.
- **CO4.** Use software tools to simulate and analyse the performance of satellite communication systems, and use real satellite up/down links (subject to the availability of satellite links) to conduct link experiments.

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CO5. Critically analyse the design requirements and the performance of satellite communication systems.

Text Books:

1. **Bruce R. Elbert**," The Satellite Communication Applications Hand Book, Artech House Boston, 1997
2. **Wilbur L. Pritchard, Hendri G. Suyderhood, Robert A. Nelson**, "Satellite Communication Systems Engineering", II Edition, Prentice Hall, New Jersey.1993

Reference Books:

1. **Dennis Rody,**" Satellite Communication", Regents/Prentice Hall, Eaglewood Cliff, New Jersey, 1983
2. **Tri T. Ha**, "Digital satellite communication", 2nd Edition, McGraw Hill, New york.1990

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Electrical Machines **Max Marks: 100**
Course Code: PEC-ECE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to electrical machines**.**

Unit-I

Transformers: Construction and working principle, classification, concept of ideal transformer, emf equation, transformer on load, phasor diagram on no load and on load, equivalent circuit, O.C and S.C tests. Losses and efficiency, All day efficiency, Voltage Regulation. Parallel operation of single phase transformer. Auto Transformer: Principle of operation, advantages, phasor diagram.

Unit-II

D C Generators: Principle of operation, construction, EMF & torque equation, power stages, losses & efficiency classification of D.C. generators, various characteristics, parallel operation of D.C. Generators, commutation & armature reaction.

Unit-III

D. C. Motors: Construction and principle of operation, classification, emf & torque equation, characteristics of D.C. motors and their applications, Electric Braking and speed control of various types of dc motors.

Unit-IV

Single Phase Induction Motors: Construction and principle of operation, Types of single phase induction motors, equivalent circuit based on double revolving field theory, Universal motors, fractional horse power motors.

Unit-V

Alternators: Basic Principle of operation, construction, emf equation, rotating magnetic field, factors effecting alternator size, Alternator on load, synchronous reactance, determination of voltage regulation, parallel operation of alternators.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic concepts and principle of operation of transformers and their types.
- **CO2.** Explain the concept of DC generators.
- **CO3.** Explain the principle of DC motors and characteristics of different DC motors.
- **CO4.** Understand the operation of Single phase induction motors.
- **CO5.** Understand principle of operation of Alternators.

Text Books:

1. **Fitzegerald A F, Kingsley C and Umans S D-** "Electrical Machinery", McGraw Hill.
2. **Nagrath I J and Kothari D P-** "Electric Machines", Tata McGraw Hill.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VIII

Course Title: Digital System Design | **Max Marks: 100**
Course Code: PEC-ECE-624 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed to impart students with the basic knowledge of modern design tools and design techniques in the field of Digital Design

Unit-I:

Digital Logic Design: Review of basic digital-logic design. Introduction to Digital Logic design. Combinational logic structured logic implementation Sequential Logic Finite-state machines.

Unit-II:

Introduction to Digital Technology: Overview of digital technology Logic Families Programmable Devices PROMs PALs and PLDs, Introduction to FPGAs and Digital Integrated circuits

Unit-III:

Hardware Description Languages and Applications: Hardware description languages (HDLs, esp. VHDL), Simple Programs using VHDL, Logic compilation Two-level and multi-level logic synthesis Technology-independent optimization Technology mapping, Sequential logic synthesis Tools for mapping to PLDs and FPGAs

Unit-IV:

Introduction to Simulation Tools: Introduction to Scilab, Basic Numerical Solving using Scilab, Applications of SciLab in 2D and 3D visualizations, Statistics and Signal Processing. Introduction to Simulink and its applications. Simple model development using Simulink. Introduction to some Modern Simulations tools like Labview, CircuitMaker, Tina (PCB Maker), Network Simulators

Unit-V:

Overview of IC Design: Introduction, Moore's Law Chip Process Flow, DPW: Motivation for Increasing Wafer Diameter Chip Design Flow, Logic, Circuit, Models, Simulation, Layout Verification and Delay Extraction, Masks and Tests

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Design various combinational and sequential digital logics.
- **CO2.** Explain various digital programmable devices such as PALs and PLDs as well as FPGAs.
- **CO3.** Understand Hardware description language and write basic programs in VHDL.
- **CO4.** Design digital logic in various simulation tools such as SciLab and Simulink.
- **CO5.** Get familiarized with Integrated Circuit design flow and process.

Books Recommended:

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1. **Volnei A. Pedroni**. "Circuit Design and Simulation with VHDL"
2. **Charles H. Roth, Jr** and **Lizy Kurian John**, "Digital System Design Using VHDL"

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Professional Electives-3

Semester VI

Course Title: RF IC Design **Max Marks: 100**
Course Code: PEC-ECE-625 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the subject is to help the students to understand the fundamentals of Radio Frequency Integrated Circuit Designs and make them familiar with the various circuit design techniques.

Unit-I

Introduction: Importance of RF and Wireless Technology: Complexity, design and applications. Choice of Technology. Basic concepts in RF Design: Nonlinearity and Time Variance, Inter-symbol Interference, Random Process and Noise. Definitions of Sensitivity and dynamic range, conversion gains and Distortion. Importance of RF Design, RF Behavior of Passive Components, Chip Components and Circuit Board Considerations, General Transmission Line Equation.

Unit-II

Active RF Component and Modeling: Semiconductor Basics, RF Diode, Bipolar Junction Transistor, RF FETs, High Electron Mobility Transistor, Diode Models, Transistor Models

Unit-III

Analog and Digital Modulation for RF Circuits: Comparison of various techniques for power efficiency. Coherent and Non-coherent detection. Mobile RF Communication systems and basics of Multiple Access techniques. Receiver and Transmitter Architectures and Testing Heterodyne, Homodyne, Image-reject, Direct-IF and sub-sampled receivers.

Unit-IV

Matching & Biasing Network & RF Filter: Overview of RF Filter design, Matching and Biasing Networks. Basic blocks in RF systems and their VLSI implementation, Low noise, Amplifier design in various technologies, Design of Mixers at GHz frequency range, various mixers- working and implementation. Oscillators- Basic topologies VCO and definition of phase noise, Noise power and trade off. Resonator VCO designs, Radio frequency Synthesizers- PLL, Various RF Synthesizer architectures and frequency dividers, Power Amplifier design, Design issues in integrated RF filters.

Unit-V

RF Transistor Amplifier and Oscillators: Characteristics of Amplifiers, Amplifiers Power Relation, Stability Considerations, Constant Gain, Noise Figure Circles, Constant VSWR Circles, Broad Band, High Power and Multistage Amplifiers. Basic Oscillator Model, High Frequency Oscillator Configuration, Basic Characteristics of Mixers.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Appreciate the importance and applications of RF and Wireless Technology.
- **CO2.** Model active RF Components used in the RF IC design.
- **CO3.** design analog and digital modulation circuits and biasing for RF Circuits.
- **CO4.** design various types of Amplifiers, oscillators and Mixers in the RF Domain.
- **CO5.** Design and simulate RF IC's using software tools and evaluate their output parameters.

Text Books:

1. **Reinhold Ludwig, Pavel Bretchko**, "RF Circuit Design", 1st Indian Reprint, 2001, Pearson Education Asia
2. **B Razavi**, "Design of Analog CMOS Integrated Circuit", McGraw Hill, 2000.

Reference Books:

1. **Y.P. Tsividis** "Mixed Analog and Digital Devices and Technology" TMH 1996
2. **Thomas H. Lee** "Design of CMOS RF Integrated Circuits" Cambridge University Press 1998.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Optoelectronic Devices | **Max Marks: 100**
Course Code: PEC-ECE-626 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of this course is to give a deeper understanding of the physics, characterization and application of novel optoelectronic devices.

Unit-I

Review of Semiconductor Device Physics: Energy bands in Solids, the E-k Diagram, concept of effective mass, free electron theory, Fermi level and quasi Fermi levels, Review of reciprocal lattice, Brillouin zone, Direct-Indirect band gap semiconductors.

Unit-II

Optoelectronic Device Physics: Optical materials – electron-hole recombination, bandgap engineering. Light interaction with materials-transparency, translucency and opacity, refraction and refractive index, reflection, absorption and transmission. Carrier generation recombination processes, R-G statistics. Carrier lifetimes, Principles of emission and absorption, Einstein's equation, Optical absorption; luminescence-photo luminescence, electroluminescence. Hetero structures and Quantum wells.

Unit-III

Semiconductor Photon Sources: PN Junction Diode, LED: Device structure, materials and characteristics. Semiconductor Laser: Basic Structure, theory and device characteristics; direct current modulation, axial and transverse laser modes, heterojunction lasers, distributed feedback lasers, quantum well lasers, tunneling based lasers, modulation of lasers. Quantum-well lasers: DFB, DBR and VCSEL; Laser diode arrays.

Unit-IV

Semiconductor Photodetectors: Principle of detection, Types of photodetectors, single junction under illumination: photon and carrier-loss mechanisms, Noise in photo detection; PIN diodes and APDs: structure, characteristics and device performance. Photo-transistors.

Unit-V

Semiconductor Optical Amplifiers & Modulators: Semiconductor Optical Amplifiers (SOA), SOA characteristics and some applications, Quantum-confined Stark Effect and Electro-Absorption Modulators, Solar cells and CCDs.

Course Outcomes:

After completion of the course student will be able to:

CO1. Describe the principles of light generation and detection, operation, and design of state-of-the-art optoelectronic and photonic devices.

CO2. Explain key concepts in quantum and statistical mechanics relevant to physical, electrical and optoelectronic properties of materials and their applications to optoelectronic devices and photonic integrated circuits

CO3. Describe fundamental and applied aspects of optoelectronic device physics and its applications to the design and operation of laser diodes, light-emitting diodes, and photodetectors.

CO4. Describe techniques to improve the operation of optoelectronic devices and device characteristics that have to be optimized for new applications by employing their understanding of optoelectronic device physics.

CO5. Explain and analyse the working principles of optoelectronic devices like CCD,SOA, solar cell etc.

Text Books:

1. **J.M. Senior**, "Optical Fiber Communication: Principles and Practice", Prentice Hall of India.
2. **Street B G and Banerjee S**, "Solid State Electronic Devices", PHI New Delhi, (2004).

Reference Books:

1. **Donald A. Neamen**, "Semiconductor Physics and Devices," McGraw.
2. **Pallab Bhattacharya**, "Semiconductor Optoelectronic Devices", 2nd Edition.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VI

Course Title: Non-Conventional Energy Sources **Max Marks: 100**
Course Code: PEC-ECE-627 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the course is to provide the students adequate knowledge of Power Generation from Renewable Energy Sources.

Unit-I

Introduction to Energy Sources: Energy scenario in India, Classification of Energy Resources, Renewable and Non-renewable Energy sources, Environment, Economy, Energy for sustainable development, Direct Energy conversion systems.

Unit-II

Hydro Energy: Renewable Hydro – potential, flow, duration and storage, Hydro Electric Power Plants, mini-micro hydro, small hydro power, types of turbines, generators & controls.

Unit-III

Wind Energy: Wind energy, potential, Site selection, Expression of power in the wind, Wind energy Conversion Systems. Types of wind Mills (Horizontal and Vertical Axis Wind Mill). Forces on Blades and Torque of Wind Mill. Lift Forces & drag Forces, wind mill generator, local control and storage.

Unit-IV

Solar Energy: Solar energy, Principle Of conversion of solar radiations into heat. Extra-terrestrial and inter-terrestrial regions, solar photovoltaic Cell, Applications of solar energy systems, Solar Water Heater, Solar Cookers, Solar Pumping

Unit-V

Other Renewable forms of energy: Bio energy, Biomass energy conversion Technologies. Methods for obtaining energy from Biomass, wave & tidal energy, ocean thermal energy systems (OTEC). Magneto Hydro Dynamic Power Generation (MHD) & fuel cells, geothermal resources, Geothermal Energy Conversions.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the importance of non-conventional energy resources for the present energy scenario.
- **CO2.** Understand the working criteria of hydro power generation.
- **CO3.** Acquire knowledge about wind energy conversion system for power generation.
- **CO4.** Analyze solar energy conversion technologies.
- **CO5.** Study other non-conventional sources of energy like geothermal resources, biomass, etc.

Text Books:

1. **Sukhatme S. P. and Nayak J. K.** Solar Energy, Tata McGraw Hill, New Delhi.
2. **Elgerd O. I.** Electrical Energy System Theory, Tata McGraw Hill, New Delhi.

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Reference Books:

1. **Singal R. K.,** Non-Conventional Energy Sources, Kataria Sons, New Delhi.
2. **Gupta B. R.,** Generation of Electrical Energy, Khanna Publications.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Power Electronics **Max. Marks: 100**
Course Code: PEC-ECE-628/PCC-EE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The objective of this course is to have knowledge of basic concepts of power electronics devices and their operational and performance characteristics, along with converters.

Detailed Contents:

Unit I

Power Semiconductor Devices & their Characteristics: Application of power electronics, classification of power semiconductor devices, ideal switch, power diodes & thyristor with characteristics, two transistor model of thyristor, di/dt, dv/dt limitations and snubber circuits, other power semiconductor devices (DIAC, TRIAC, IGBT, MOSFET) with their characteristics.

Unit II

AC to DC Converters: Types of AC to DC converters, single phase half-wave and full-wave controlled rectifiers with resistive load, inductive load and freewheeling diode, detailed derivation of RMS, average value, harmonic factor, displacement factor, THD, crest factor. Introduction to three phase full and semi controlled rectifiers, dual converters.

Unit III

DC to DC Converters: Principle of chopper, control techniques of chopper (TRC and CLC), switching regulators: Buck, Boost, Buck-Boost, basic principles of SMPS and UPS, Introduction to resonant converters.

Unit IV

DC to AC Converters: Voltage-driven inverter, current-driven inverter, Single-phase inverter with resistive load, inductive load, Sinusoidal PWM Inverter, Introduction to resonant inverters, three phase inverter, 120–180-degree conduction.

Unit V

AC to AC Converters: AC Voltage Controllers: Single and three phase AC voltage controllers. Cycloconverters: Single phase to single-phase, three-phase to single-phase, three-phase to three-phase cycloconverter circuit and their operation.

Course Outcome:

At the end of the course the students will be able to

CO1. Articulate the basics of power electronic devices and characteristics of SCR, DIAC, TRIAC, MOSFET and IGBT.

CO2. Express the design and control of converters.

CO3. Design of power electronic converters in power control applications.

CO4. Ability to design AC voltage controller, Chopper circuit, Inverter circuit and Cyclo-Converter.

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CO5. Analyze the operation of DC-DC choppers and voltage source inverters.

Text Books/References:

1. **M. H. Rashid**, "Power electronics: circuits, devices, and applications", Pearson Education India, 2009.
2. **N. Mohan and T. M. Undeland**, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
3. **R. W. Erickson and D. Maksimovic**, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
4. **L. Umanand**, "Power Electronics: Essentials and Applications", Wiley India, 2009.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting one from each unit.

Professional Electives-4

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Semester VII

Course Title: Random Processes & Information Theory **Max Marks: 100**
Course Code: ECE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Probability and Random Variable: Axioms of probability – Joint & Conditional probability - Total probability – Baye's theorem, Independent Events, Random variable - Probability mass function - Probability density functions- Properties, Cumulative distribution function Properties, Functions of a random variable (only one dimensional).

Unit-II

Standard Distributions: Mathematical Expectations, Moments, Moment generating functions and their properties, Characteristic functions. Transformation of random variables - Central limit theorem, Expected Value, Variance & Moment of a random variable. Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions and their properties.

Unit-III

Classification of Random Processes: Definition & Classification of Random Process, First Order, Second order, strictly stationary, wide sense stationary and ergodic processes, Markov, Process, Binomial, Poisson and Normal processes.

Unit-IV

Correlation and Spectral Densities: Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function - Linear time invariant system - System transfer function –Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

Unit -V

Information Theory: Uncertainty, Information and entropy, Source coding theorem, Data compaction, Discrete memory less channels, mutual information, channel capacity, channel coding theorem, Differential entropy, and mutual information for continuous ensembles, information capacity theorem, implication of the information capacity theorem, rate distortion theory, Compression of information.

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basic concepts of Probability & Random Variables & able to solve numerical problems.
- **CO2.** Understand various standard distributions used in various fields of engineering
- **CO3.** Understand different types of Random processes.
- **CO4.** Understand the concept of correlation & apply it on Linear time invariant systems.
- **CO5.** Understand the concept of Information Theory in the field of communication systems & design solutions for noise free channels.

Text Books:

1. **A Papoulis & Pillai:** Probability, Random Variables & Stochastic Processes, TMH
2. **Ross, S-**A First Course in Probability, Fifth edition, Pearson Education, Delhi.

Reference Books:

1. **Stark and Woods John W -**Probability and Random Processes with Applications to Signal Processing, Pearson Education, Third edition, Delhi, 2002.
2. **Veerarajan. T-** Probability, Statistics and Random process, Tata McGraw-Hill Publications, Second Edition, New Delhi, 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Advanced 3G and 4G Wireless & Mobile Communication **Max Marks: 100**
Course Code: PEC-ECE-722 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: This course is intended as an introductory course for the final year student to look at current and upcoming wireless communication technologies for broad band wireless access.

Unit-I

Cellular communication: Introduction to Cellular Communications, Frequency reuse, Multiple Access Technologies, Cellular Processes – Call Setup, Handover. CDMA: Introduction to CDMA, Walsh Codes, PN Sequences, Multipath diversity, RAKE Receiver

Unit-II

Wireless Communications and Diversity: Fading: Concept and its types, Fast Fading Wireless Channel Modelling, Rayleigh Fading Channels, BER Performance in Fading Channels, Diversity modelling for Wireless Communications, BER Performance Improvement with diversity, Types of Diversity.

Unit-III

OFDM: Introduction to OFDM, Multicarrier Modulation and Cyclic Prefix, Channel model and SNR performance, OFDM issues - PAPR, Frequency and Timing Offset Issues

Unit-IV

MIMO: Introduction to MIMO, MIMO channel capacity, SVD and Eigen modes of the MIMO channel, MIMO special multiplexing-BLAST, MIMO diversity-Alamouti, MIMO- OFDM

Unit-V

Ultra-wide band: UWB definition and features, UWB wireless channels, UWB data modulation, uniform pulse train, Bit error rate performance of UWB, Introduction to 5G Communication

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system and its working.
- **CO2.** Design different wideband channel model.
- **CO3.** Understand OFDM in detail, identify different OFDM issues.
- **CO4.** Identify different ST channels and design MIMO channel.
- **CO5.** To Understand Ultra-Wide Band technology.

Text Books:

1. **Arogyaswami Paul raj:** Introduction to space, time wireless communication. Cambridge university press
2. **John G Proakis**, Digital Communication, McGraw Hill.

Reference Books:

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1. **Andreas Molisch**, Wireless communication-WILEY IEEE press
2. **Mischa Schwartz,** Mobile wireless communication- Cambridge university press

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Analog and Mixed Signal Design | **Max. Marks: 100**
Course code: PEC-ECE-723 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The principle objective of this subject is to introduce students to various analog and mixed signal design approaches.

Unit-I:
Mixed Design Introduction: Analog Design Octagon, Issues and Challenges in Analog Design, Need & Importance of Analog design.

Unit-II:
MOS Models: Basic MOSFET stages, Common Source stage with resistive load, diode connected load (basic derivation), Casode stage and advantages, Common Gate stage

Unit-III:
Differential Amplifier: Single ended and differential operation, Analysis and working of Differential amplifier, Half-circuit concepts

Unit-IV:
Analog circuits: Voltage-Controlled oscillators, Current Mirrors, Comparators

Unit-V:
Noise: Types of Noise, Statistical characteristics, Noise-Power Trade off, Noise Bandwidth

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** To understand the analog design challenges
- **CO2.** To analyse MOSFET analog circuits in various configurations
- **CO3.** To understand operation of Current Mirrors and Voltage controlled oscillators
- **CO4.** To understand and model various types of noise

Reference Books:

1. **Behzad Razavi**, "Design of Analog CMOS Integrated Circuits", McGraw Hill 2000
2. **Sedra and Smith**, "Micro electronic Circuits Theory and Applications", Oxford 2018

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Device Modeling for Circuit Simulations | **Max. Marks: 100**
Course code: PEC-ECE-724 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To provide basic foundation of device modelling in order to design various circuits and address various circuit design issues

Unit-I
MOSFET Capacitor, Modelling equations of MOSFET (Derivation), PSPICE LEVEL 1 parameters

Unit-II
Circuit Simulation, AC, DC, Transient, noise, temperature extra analysis.

Unit-III
Semiconductor Devices: pn junction diode-DC and small signal. **BJT**: small signal, high frequency model. **MOSFETs**: DC, small signal, high frequency model

Unit-IV
Device SCALING: short channel effects in MOSFETs (V_{TH} roll-off, DIBL, Charge sharing), MOSFET channel mobility model,

Unit-V
Advanced Semiconductor devices: HBTs & HEMT, Tunnel Field Effect Transistors

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** To understand MOSFET design equations and implementation in PSPICE .
- **CO2.** To understand short-channel effects and challenges thereof in designing Miniaturized devices
- **CO3.** To get familiar with operation principles of advanced MOSFET devices
- **CO4.** To implement MOSFET design equations in PSPICE and analyse results

Reference Books:

1. **M. H. Rashid**, "Power Electronics Circuits Devices and Applications," Pearson Education, 2004.
2. **S.M. Sze,** "Physics of semiconductor devices", Wiley Pub.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Professional Electives-5
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Semester VII

Course Title: Biomedical Instrumentation | **Max Marks: 100**
Course Code: PEC-ECE-725 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the course is to get the students acquainted with the Biomedical Instrumentation.

Unit-I

Introduction to biomedical instrumentation: Introduction of Biomedical Engineering, Biometrics, Man instrument system, Components of Man instrument system. Resting potential, action potential, typical wave form of action potential, propagation of action potential, recording of action potential.

Unit-II

Electrodes, Transducer and Amplifiers: Introduction of Bio-Electrodes, Properties of Bio-Electrodes, different types of electrodes, Sensors, Diaphragms, Force sensors. Introduction of transducers, classification of transducers, Biological Amplifiers (Instrumentation amplifies, chopper amplifiers)

Unit-III

Electro Potential Recording: The heart and cardiovascular system, ECG, EEG, EMG, lead systems and recording methods, typical waveforms and signal characteristics and block diagrams of ECG, EEG, EMG.

Unit-IV

Human Assist Devices: Cardiac pacemakers, Classification of Pacemakers, Defibrillators, AC Defibrillators, DC Defibrillators, Indirect measurement, direct measurement, automated indirect method, magnetic blood flow meters, ultrasonic blood flow meter.

Unit-V

Imaging Techniques: Introduction to X-rays, Properties of X-rays, Production of X-rays, Block Diagram of X-ray Machine, Ultrasound in medicine, physics of ultrasonic waves, types, A-mode, M-Mode, Doppler mode, Introduction of Computed tomography, Introduction of MRI.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand biomedical instrumentation, propagation of action potential.
- **CO2.** Acquire knowledge of electrodes, transducers & amplifiers used in biomedical instrumentation.
- **CO3.** Apply the knowledge of science, engineering fundamentals & engineering specialization for electrode potential recording.
- **CO4.** Understand different human assist devices.
- **CO5.** Gain knowledge of different imaging techniques used in medical science.

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Text Books:

1. **Khandpur, R.S**., "Handbook of Biomedical Instrumentation", TATA McGraw-Hill, New Delhi, 1997.

Reference Books:

1. **Joseph J. Carr and John M. Brown**, Introduction to Biomedical Equipment Technology, John Wiley and Sons, New York, 1997.
2. **Leislie Cromwell**, Biomedical instrumentation and measurement, Prentice Hall of India, New Delhi, 2002

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Semester VII

Course Title: Biomedical Instrumentation Lab | **Max Marks: 50**
Course Code: PEC-ECE-731 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. To observe ECG waveforms of subject (Human body) using Lead I of standard bipolar lead configuration
2. To observe ECG waveforms of subject (Human body) using Lead II of standard Bipolar lead configuration.
3. To observe ECG waveforms of subject (Human body) using Lead III of standard Bipolar lead configuration
4. To measure the Heart-Rate of subject (Human body)
5. To study Real time EMG waveforms of subject (Human body)
6. To study EEG waveforms in unipolar recording mode

Course Outcomes:

After completion of the course student will be able to:

CO1. To analyze and explore biomedical setups.
CO2. To perform experimentation with ECG setup.
CO3. To perform experimentation with EMG setup.
CO4. To perform experimentation with EEG setup.

Semester VII

Course Title: Radar Engineering | **Max Marks: 100**
Course Code: PEC-ECE-726 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Introduction to Radar - Basic Radar -The simple form of the Radar Equation- Radar Block Diagram- Radar Frequencies -Applications of Radar - The Origins of Radar, The Radar Equation Introduction- Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio- Probability Density Functions.

Unit-II

MTI and Pulse Doppler Radar - Introduction to Doppler and MTI Radar- Delay -Line Cancelers- Staggered Pulse Repetition Frequencies -Doppler Filter Banks - Digital MTI Processing - Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) - Pulse Doppler Radar

Unit-III

Detection of Signals in Noise - Introduction - Matched -Filter Receiver -Detection Criteria - Detectors --Automatic Detector - Integrators - Constant-False-Alarm Rate Receivers - The Radar operator - Signal Management - Propagation Radar Waves - Atmospheric Refraction -Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas - Phase Shifters Frequency-Scan Arrays.

Unit-IV

Radar Transmitters- Introduction -Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources - Other aspects of Radar Transmitter.

Unit-V

Radar Receivers - The Radar Receiver - Receiver Noise Figure - Superheterodyne Receiver - Duplexers and Receiver Protectors- Radar Displays.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the essential principles of operation of radar systems.
- **CO2.** Understand the principles behind detection of Radar signals in noise.
- **CO3.** Design simple radar systems and the associated signal processing, at block diagram level.
- **CO4.** Apply the relevant design equations to phased array antennas, and understand the advantages and constraints of phased array radar.
- **CO5.** Design and describe various circuits and systems of Radar transmitters and receivers.

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Text Books:

1. **Merrill I. Skolnik**," Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2003

Reference Books:

1. **Peyton Z. Peebles,** "Radar Principles", John wiley, 2004.
2. **J.C Toomay**, " Principles of Radar", 2nd Edition -PHI, 2004

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Radar Engineering Lab | **Max Marks: 50**
Course Code: PEC-ECE-732 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. To study the working of Doppler RADAR.
2. To determine the velocity of the object moving in the RADAR range.
3. To understand the principle of Doppler Radar of Time and frequency measurement with moving pendulum.
4. To study the alarm system by using RADAR.
5. To study the object counting with the help of RADAR.
6. To study the detection of vibration of different Tuning forks.
7. Determine the rotation per minute (RPM) of the moving object (fan).
8. To study the effect of different types of materials on RADAR receiving or detection.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the working of RADAR.

CO2. Understand the Doppler's effect.

CO3. Develop the understanding of different applications of RADAR.

CO4. To analyse the effect of different types of materials on RADAR performance

Semester VII

Course Title: Optical Communication | **Max Marks: 100**
Course Code: PEC-ECE-727 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles of Optical Communication to the students. Applied and Industrial Aspects of optical communication have been taken care of in an appropriate manner.

Unit–I

Overview of Optical Fiber Communication: Brief Overview of Optical Communication, Basic concepts, light wave components, principle of light transmission, channel capacity etc. Nature of light, polarization, basic laws and definition, mode theory analysis for optical communication, optical fiber modes and configuration, wave propagation in optical fiber, operating wavelength, single mode and multimode fibers, V–numbers, mode field diameter, numerical aperture, refractive index profiles.

Unit–II

Signal Degradation in Optical Fibers: Attenuation, absorption, scattering losses, bending losses in optical fibers. Dispersion in optical waveguides, group delay, material dispersion, waveguide dispersion, intermodal dispersion and chromatic dispersion in single mode fibers, Non linearities in Fibers

Unit–III

Optical Sources: Basic concepts from semiconductor electronics, energy bands, Concept of Direct and indirect Band Devices. Light emitting diodes: Structure, principle, material, modulation response, transient response. Laser diodes: Principle of action, structure, efficiency and characteristics of laser diodes, modulation He–Ne lasers, DFB lasers.

Unit-IV

Optical Detectors: Basic Information in light detectors, Role of an optical detector, Detector Characteristics: Responsivity, Noise Equivalent Power, Detectivity, Quantum efficiency, Detector response time, Linearity, Spectral response, Noise Considerations, The PN junction photo diode – PIN photodetectors – Avalanche photo diode construction characteristics and properties, APD Specifications, simple model of photo receiver – its equivalent for SNR, Optical Receivers.

Unit–V

Transmission Systems and Advanced Multiplexing Strategies: Power Launching and coupling. Point to point link system consideration, Optical TDM, subscriber multiplexing (SCM), WDM and Hybrid multiplexing methods, Optical amplifiers - EDFA

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** To recognize and classify the structures of Optical fiber systems and their types.
- **CO2.** To understand the channel impediments like losses, interference and dispersion.
- **CO3.** To understand the Optical sources and detectors and thus able to illustrate their working principle.
- **CO4.** To familiarise with Design considerations of fiber optic systems.
- **CO5.** To understand the transmission consideration and multiplexing strategies

Text Books:

1. **John M Senior -**Optical Comm Techniques –PHI
2. **Keiser G-** Optical Fiber Communication, 3rd Edition, Mc Graw Hill International

Reference Books:

1. **Ghatak & Thyangarajan K**- Introduction to fiber optics, Cambridge university press,1998.
2. **Mynbacv D.F. and Scheine L -**Fiber Optic Communication Technique, Pearson.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VII

Course Title: Optical Communication Lab | **Max Marks: 50**
Course Code: PEC-ECE-733 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. Setting up a fiber analog link and study of propagation and bending losses in optic fiber.
2. Study of characteristics of optical fiber.
3. Setting up a fiber optic digital link.
4. To understand Bending loss in optical fiber.
5. To calculate Acceptance angle for optical communication.
6. Study of modulation/demodulation of light source by PWM & PPM techniques.
7. Study of TDM using 16 data channels.
8. Voice communication through Laser TX. & RX.

Course Outcomes:

After completion of the course student will be able to:

CO5. To analyze and explore Optical setups.
CO6. To perform optical measurement for various parameters.
CO7. To establish voice communication through optical communication setup.
CO8. To understand the characteristics of optical fiber with frequency response.

Professional Electives-5

Semester VIII

Course Title: Adaptive Signal Processing | **Max Marks: 100**
Course Code: PEC-ECE-821 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Unit-I

Introduction to Adaptive signal processing: Definitions, Characteristics, Applications, Example of an Adaptive System. The Adaptive Linear Combiner – Description, Weight Vectors, Desired Response Performance function – Gradient & Mean Square Error.

Unit-II

Development of Adaptive Filter Theory & Searching the Performance surface: Introduction to Filtering – Smoothing and Prediction – Linear Optimum Filtering, Principle of Orthogonally – Minimum Mean Square Error, Wiener- Hopf equations, Error Performance – Minimum Mean Square Error, Estimation of phase shift between two narrow band signals using Orthogonal Decomposer

Unit-III

Steepest Descent Algorithms: Searching the performance surface – Methods & Ideas of Gradient Search methods – Gradient Searching Algorithm & its Solution – Stability & Rate of convergence – Learning Curves Gradient Search by Newton's Method, Method of Steepest Descent, Comparison of Learning Curves.

Unit-IV

LMS Algorithm & Applications: Overview – LMS Adaptation algorithms, Stability & Performance analysis of LMS Algorithms – LMS Gradient & Stochastic algorithms – Convergence of LMS algorithm. Applications: Adaptive BFSK, BPSK, ASK demodulators and delay estimation.

Unit-V

State Estimators: Introduction to RLS Algorithm, Kalman filtering problem, The Innovation Process, Estimation of State using the Innovation Process- Expression of Kalman Gain, Filtering Example estimation of state from observations of noisy observed narrow band signals

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Get a basic understanding of adaptive systems
- **CO2.** Design and analyse various filters.
- **CO3.** Identify applications in which it would be possible to use the different adaptive filtering approaches and implement them in software.
- **CO4.** Design, implement and apply LMS to given applications.
- **CO5.** Use MATLAB to implement the RLS and KALMAN algorithms.

Text/Reference Books:

1. **Bernard Widrow, Samuel D.Strearns**, "Adaptive Signal Processing", 2005, PE.

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2. **Simon Haykin, "Adaptive Filter Theory**", 4th Edition. 2002, PE Asia.
3. **Sophocles. J. Orfamadis**, "Optimum signal processing: An introduction", 2nd Edition, 1988, McGraw-Hill, Newyork
4. **S. Thomas Alexander**, "Adaptive signal processing-Theory and Applications", 1986, Springer –Verlag.
5. **Candy**, "Signal analysis", McGraw Hill Int. Student Edition

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VIII

Course Title: Digital Image Processing | **Max. Marks: 100**
Course code: PEC-ECE-822 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To introduce the fundamentals of image processing and various image related operations and applications

Unit-I

Introduction and Digital Image Fundamentals

Digital Image Representation, Fundamental Steps in Image Processing, Elements of Digital image processing systems, Sampling and quantization, some basic relationships like neighbors, connectivity, Distance measure between pixels, Imaging Geometry.

Unit-II

Image Enhancement

Intensity Transformations, Histogram Processing, Spatial domain methods, Frequency domain methods, Enhancement by point processing, Spatial filtering, Low-pass filtering, High-pass filtering.

Unit-III

Image Restoration

Noise Models, Restoration in presence of noise only: Mean and Adaptive filters, Periodic noise reduction: Bandpass, Band reject, Notch and Optimum filters, Estimating degradation function, Inverse filtering, Weiner Filtering and Geometric mean filter.

Unit-IV

Image Compression

Image Compression fundamentals, Coding Redundancy, Fidelity criteria, Image Compression models, Image compression standards and basic Image Compression models: Huffman, Golomb, Arithmetic, LZW and Run Length coding. **Basics of Image Segmentation** Point Line and edge detection: Detection of isolated points, line detection and edge models, Thresholding: Global and Multiple, Region based Segmentation: Growing, Splitting and Merging.

Unit-V

Representation and Description

Representation schemes like chain coding, Polygonal Approximation, Signatures, Boundary Segments, Skeleton of region, Boundary description: Simple and Shape based, Regional descriptors: Simple, Topological and Texture.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Explain the various fundamentals of digital image processing.
- **CO2.** Implement different image enhancement in spatial and frequency domain.
- **CO3.** Analyse various image restoration approaches.

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CO4. Classify various image compression techniques and implement different image segmentation techniques.

CO5. Interpret various image restoration and description techniques.

Reference Books:

1. **Rafael C. Conzalez & Richard E. Woods**, "Digital Image Processing", AWL.
2. **A.K. Jain**, "Fundamental of Digital Image Processing", PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VIII

Course Title: Nanotechnology | **Max Marks: 100**
Course Code: PEC-ECE-823 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the subject is to help the students to understand the fundamentals of nanotechnology along with various design techniques used in this area.

Unit-I

Introduction: Definition of Technology node, Basic CMOS Process flow, MOS Scaling theory, Issues in scaling MOS transistors: Short channel effects, Description of a typical 65 nm CMOS technology. Background to Nano-technology, scientific revolutions, types of Nanotechnology and Nanomachines, MEMS and NEMS.

Unit-II

Materials: Nano powders and Nano materials: introduction, preparation. Emerging nano materials: Nanotubes, nanorods and other nano structures, LB technique, Soft lithography etc. Microwave assisted synthesis, Self-assembly etc. Nano medicines and their applications.

Unit-III

Nano-Tubes: Graphene, SWNTs and MWNTs, Structure of carbon nanotubes, Carbon nanotube reactor**,** formation/synthesis of nano tube, applications.

Unit-IV

Nano Electronics: Nano-electronics: Introduction, CNTFET, Transport in Nano MOSFET, velocity saturation, ballistic transport, injection velocity, velocity overshoot. Quantum electronic devices.

Unit-V

Characterization techniques for nanomaterials: FTIR, XRD, AFM, SEM, TEM, EDAX etc. Applications and interpretation of results.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basics of Nanotechnology along with MEMS and NEMS technology.
- **CO2.** Describe the preparation and applications of various nanomaterials.
- **CO3.** Explain the synthesis and application of Carbon Nanotubes.
- **CO4.** Understand various nano-electronic approaches such as CNTFET and quantum devices.
- **CO5.** Get familiarized with various nanotechnology related fabrication and characterization techniques.

Text books:

1. **Michael Wilson, Kamali Kannangara, Geoff Smith, Michelk Simon**, "Nanotechnology: Basic science and Emerging technologies."
2. "Implications of Micro and Nano technologies", committee on Implications nanotechnologies, Air force Science and Technologies.

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Reference Books:

1. **Risal Singh, ShipraMital Gupta**, "Introduction to Nanotechnology: Understanding the Essentials", Oxford University press, 2016
2. **Charles P. Pool, Frank J. Owens**, "Introduction to Nanotechnology", Wiley, 2007

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VIII

Course Title: Optical Networks | **Max. Marks: 100**
Course code: PEC-ECE-824 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objectives: This course will impart the student with deep understanding of the functionality of optical networks and its implementation.

Unit-I

Introduction to Optical Network: Services, Circuit Switching, Packet Switching, Optical Networks, Optical Layer, Transparency and All Optical Networks, Optical Packet Switching, Transmission Basics, Network Evolution.

Unit-II

Optical Amplifiers: Stimulated Emission, Spontaneous Emission, Erbium Doped Fiber amplifiers, Raman amplifiers, Semiconductor Optical Amplifiers, Cross talk in SOAs.

Unit-III

Multiplexers and Filters to Wavelength Converters: Gratings, Diffraction Pattern, Bragg Gratings, Fiber Gratings, Fabry-Perot filters, Multilayer Dielectric Thin-Film Filters, Mach-Zehnder Interferometers, Arrayed Waveguide Grating, Acousto-Optic Tunable Filter, High channel Count Multiplexer Architectures, Optoelectronics Approach, Optical Gating, Interferometric Techniques, Wave Mixing.

Unit-IV

Transmission System Engineering: System Model, Power Penalty, Transmitter, Receiver, Optical Amplifiers, Cross talk, Dispersion, Fiber Nonlinearities, Wavelength Stabilization Design of Soliton Systems, Design of Dispersion –Managed Soliton Systems.

Unit-V

WDM Network Elements & Design: Optical Line Terminals, Optical Line Amplifiers, Optical Add/Drop Multiplexers, Optical Cross connects. Cost Trade-Offs: A Detailed Ring Network Example, LTD and RWA Problems, Dimensioning Wavelength-Routing Networks, Statistical Dimensioning Models, Maximum Load Dimensioning Models

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the different optical switching methods and transmission basics in optical networks
- **CO2.** Explain the construction and working of various optical amplifiers
- **CO3.** Get familiar with various multiplexers and filters for wavelength conversion
- **CO4.** Understand the various concepts and aspects of optical transmission systems
- **CO5.** Design wavelength division multiplexing based optical networks by considering various trade-offs

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Text / Reference Books:

1. **G.P. Agarwal**, "Fiber optic communication systems", 2nd Edition, John Wiley & Sons, New York, 1997.
2. **Franz and Jain**, " Optical communication system ", Narosa Publications, New Delhi, 1995.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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OPEN ELECTIVE-1

(Offered to the Department of ECE students by Other Departments)

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Course Title: Object Oriented Programming with C++ **Max. Marks: 100**
Course code: OEC-ECE-521/PCC-CSE-322 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

Unit-I

Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm,
Basic concepts of OOP`s, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of structured and object-oriented programming languages.

Unit-II

Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.

Unit-III

Classes and Objects: Classes and objects, access specifies in C++, constructors, destructors, Inline Functions, Friend Functions.
Polymorphism: Function Overloading, Operator Overloading, Type Conversions in C++. Dynamic memory allocation in C++.

Unit-IV

Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi-level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding.

Generic programming with templates: Class templates, Function Templates.

Unit-V

Exception Handling and Files: Exceptions, Types of Exceptions, throwing and catching exceptions. Streams and Files: Opening and closing a file, File Pointers and their Manipulations, sequential Input and Output Operations, multi-file Programs, Command Line Arguments.

Course Outcomes:

At the end of this course, students will be able to:

- **CO1.** Specify simple abstract data types and design implementations, using abstraction functions to document them.
- **CO2.** Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- **CO3.** Name and apply some common object-oriented design patterns and give examples of their use.
- **CO4.** Design applications with an event-driven graphical user interface.

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CO5. Must be able to understand and use Exception handling

Text Books:

1. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.

2. **Balagurusamy E,** Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. **Bjarne Strustrup,** The C++ programming Language, Addison Wesley.

2. **Booch,** Object Oriented Analysis and Design with Applications, Addison Wesley.

3. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Java Programming **Max. Marks: 100**
Course Code: OEC-ECE-522/PCC-ITE-524 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objectives: To enhance skills of student with the ever demanding programming language Core Java.

Unit-I

Overview of Java: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Byte code, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

Unit-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

Unit-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

Unit-IV

I/O, Applets and String Handing Files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, Print Writer Class, Reading and Writing Files, Transient And Volatile Modifiers, InstanceOf, Strictfp, Native Methods. Applets: Introduction: Applet Fundamentals, Applet Architecture. Strings: String Constructors, String Operations, String Buffer, String Builder, Sting Tokenizer.

Unit-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Course Outcomes:

At the end of this course, the students will able to do the following:

- **CO1.** Identify classes, objects, members of a class and relationships among them needed for a specific problem.
- **CO2.** Write Java application programs using OOP principles and proper program structuring.
- **CO3.** Demonstrate the concepts of polymorphism and inheritance.
- **CO4.** Write Java programs to implement error handling techniques using exception handling.

Text Books:

1. **P. Naughton & H. Schildt,** Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2. **K. Arnold & J. Gosling,** The Java Programming Language, 2nd Edn, Addison Wesley, 1996.

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Reference Books:

1. **Cay S. Horstmann, Gary Cornell,** Core Java 2 Volume I Fundamentals, 5th Edn

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Power System-I **Max. Marks: 100**
Course Code: OEC-ECE-523/PCC-EE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to develop an understanding of the diverse concepts of power system generation, transmission and distribution. It also involves the study of various power transfer methods and phenomenon associated with power system.

Detailed Contents:

Unit-I

Electric Supply System: Typical A.C. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Advantages of High Transmission Voltage, Various Systems of Power Transmission, Comparison of Conductor Material in Overhead System, Comparison of Conductor Material in Underground System, Comparison of Various Systems of Transmission Elements of a Transmission Line, Economics of Power Transmission, Economic Choice of Conductor Size, Economic Choice of Transmission Voltage, Requirements of satisfactory electric supply, Main components of Overhead Lines, Conductor Materials, Bundled Conductors, Line Supports, Insulators, Type of Insulators, Potential Distribution over Suspension Insulator, String Efficiency, Methods of Improving String Efficiency, Corona, Factors affecting Corona, Advantages and Disadvantages of Corona, Methods of Reducing Corona Effect, Sag in Overhead Lines, Calculation of Sag, Some Mechanical principles.

Unit-II

Distribution System: Classification of Distribution Systems, A.C. Distribution, D.C. Distribution, Methods of obtaining 3-wire D.C. System, Overhead versus Underground System, Connection Schemes of Distribution System, Requirements of a Distribution System, Design Considerations in Distribution System. Types of D.C. Distributors, D.C. Distribution Calculations, D.C. distributor fed at one end (concentrated loading), Uniformly loaded distributor fed at one end, Distributor fed at both ends(concentrated loading), Uniformly loaded distributor fed at both ends, Distributor with both concentrated and uniform loading, Ring Distributor, Ring main distributors with Interconnector, 3-wire D.C. system, Current distribution in 3-wire D.C. System, Balancers in 3-wire D.C. system, Booster, Comparison of 3-wire and 2-wire D.C. distribution, Ground detectors. A.C. Distribution Calculations, Methods of solving A.C. Distribution Problems, 3-phase unbalanced loads, 4-wire, star-connected unbalanced loads, Ground detectors.

Unit-III

Constants of a Transmission Line: Resistance of a Transmission Line, Skin effect, Flux Linkages, Inductance of a Single Phase Overhead Line, Inductance of a 3-Phase Overhead Line, Concept of self-GMD and mutual GMD, Inductance Formulas in terms of GMD, Electric Potential, Capacitance of a Single Phase Overhead Line, Capacitance of a 3-Phase Overhead Line.

Unit-IV

Classification of overhead Transmission Lines: Performance of Single Phase Short Transmission Lines, Three-Phase Short Transmission Lines, Effect of load p. f. on Regulation and Efficiency, Medium Transmission Lines, End Condenser Method, Nominal T Method, Nominal Π Method, Long Transmission Lines, Analysis of Long Transmission Line, Generalised Constants of a Transmission Line, Determination of Generalised Constants for Transmission Lines.

Unit-V

Underground Cables: Construction of Cables, Insulating Materials for Cables, Classification of Cables, Cables for 3-PhaseService, Laying of Underground Cables, Insulation Core Cable, Dielectric Stress in a Single Core Cable, Most Economical Conductor Size in a Cable, Grading of Cables, Capacitance Grading, Inter sheath Grading, Capacitance of 3-Core Cables, Measurement of Cc and Ce, Current carrying capacity of underground cables, Thermal resistance, Thermal resistance of dielectric of single-core cable, Permissible current loading, Types of cable faults, Loop tests for location of faults in underground cables, Murray loop test, Varley loop test.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the various concept of power system and realize its importance.

CO2. Understand the working of various distribution systems

CO3. Understand the various constants of transmission lines

CO4. Evaluate performance analysis on transmission lines

CO5. Understand various Underground Cables

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.
2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
3. **A. R. Bergen and V. Vittal,** "Power System Analysis", Pearson Education Inc., 1999.
4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.
5. **B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac**, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Environmental Engineering.
Course Code: OEC-ECE-524/PCC-CE-522
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Internal Assessment: 40
Credits 3(2-1-0)

Objective: This course aims to make students understand the various aspects of environment and to understand the impact of humans on environment.

UNIT -I

Water quality and treatment: Water demand Residential, Commercial, Institutional, industrial and agricultural, Forecasting of water demand, Sources of Water, water quality parameters, Water quality standards, Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes, Water Supply systems, Components of water supply system, Distribution system, Plumbing and various valves used in water supply systems.

UNIT II

Sewage Characteristics and treatment: Quantity of Sewage, Sewage flow variations, Characteristics and composition of sewage, Pollution due to improper disposal of sewage, Sewerage system and its components, Design of Sewerage system primary, secondary and tertiary treatment of sewage- description of various unit operation and processes, aerobic and anaerobic treatment systems, suspended and attached growth systems, quality requirements (Regulatory standards) for various usages.

UNIT III

Air Pollution and control: Definition of Air pollution, major pollutants- sources and impacts, Air Quality standards, Air pollution meteorology, Plum rise and plum behaviour, Introduction to air quality models and their applications, Monitoring of air pollutants, Control measures.

UNIT IV

Solid waste management- Solid waste, Municipal, industrial and hazardous solid waste, Characteristics and Composition of solid waste, Impact of improper disposal of solid waste, solid waste management, Elements of solid waste management system- generation, collection, transfer and transport, segregation, recycling, reuse, disposal, composting, vermin composting and landfills

UNIT V

Noise pollution and control: Noise pollution, sources (Indoor and outdoor) and impacts, Permissible limits, measurement of noise, Addition of Noise, Noise propagation, control of noise pollution- at source.

Course Outcomes: After successfully studying this course, students will:

1. Understand the impact of humans on environment and environment on humans
2. Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.

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3. Be able to plan strategies to control, reduce and monitor pollution.
4. Be able to select the most appropriate technique for the treatment of water, waste water solid waste and contaminated air.
5. Be conversant with basic environmental legislation.

Text books:

1. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg S.K: Water Supply Engineering (Environmental Engineering Vol.–I) 4. Garg S.K: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Reference Books:

1. Modi, P. N;Water supply Engineering. Volume-I
2. Introduction to Environmental Engineering and Science by Gilbert Masters, PrenticeHall, New Jersey.
3. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan,Thompson /Brooks/Cole.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit. **Course Title:**

Natural Language Processing **Max. Marks: 100**
Course code: OEC-ECE-525/PEC-CSE-725 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objectives:

The main objectives of this course are:

1. To introduce the fundamental concepts and techniques of NLP
2. To examine NLP models and algorithms using both traditional symbolic and more recent statistical approaches.
3. To study the phonology, morphology, syntax and semantic of language using both linguistic and algorithmic perspective.
4. To study computational properties of natural languages and of the algorithms used to process them, as well as the match between grammar formalisms and the linguistic data that needs to be covered.

Unit-I

Introduction to Natural Language Processing, Natural Languages and Formal Languages, Regular Expressions and Automata, Words and their Analysis. Tokenization, Stemming, Part of Speech (POS) tagging, Morphological Analysis.

Unit-II

N-Grams and Part of Speech Tagging: N-grams Models of Syntax, Counting Words in Corpora, Simple (Unsmoothed) N-grams, Smoothing, Back-off, Part of speech Tagging, Rule-Based Part of Speech Tagging, Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models and Conditional Random Fields

Unit-III

Syntax Parsing: Context-Free Grammars for English Syntax, Context Free Rules and Trees, Sentence, Level Constructions, Agreement, Sub Categorization, Parsing with Context-Free Grammars, Top-down Parsing, Bottom-Up Parsing, Feature Structures, Probabilistic Context-Free Grammars.

Unit-IV

Semantic Analysis: Representing Meaning, Meaning Structure of Language, First Order Predicate Calculus, Representing Linguistically Relevant Concepts, Syntax-Driven Semantic Analysis, Word-Sense disambiguation, Supervised – Dictionary based and Unsupervised Approaches – Machine Learning.

Unit-V

Applications of Natural Language Processing: Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment-phrase-based translation.

Course outcomes:

After completing this course, the student should be able to:

- **CO1.** Understand the basic concepts of language for processing.
- **CO2.** Implement different data models for language processing.
- **CO3.** Understand parsing techniques related to English language.
- **CO4.** Process and analyse the language semantically.

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CO5. Understand the application of NLP.

Text Books:

1. **Daniel Jurafsky and James H. Martin,** Speech and Language Processing (2nd Edition), PHI
2. **Christopher D. Manning and Hinrich Schuetze,** Foundations of Statistical Natural Language Processing, MIT Press, 1999

Reference Books:

1. **Pierre M. Nugues**, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special Consideration of English, French, and German (Cognitive Technologies) Softcover reprint, 2010

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

OPEN ELECTIVE-2
(With Laboratories)

Course Title: Python Programming **Max. Marks: 100**
Course code: OEC-ECE-621/PCC-CSE-422 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: Python is a modern language useful for writing compact code specifically for Programming in Server-Side web Development, AI, data analytics and Game Programming. This course covers the basics and advanced python programming to harness its potential for modern computing requirements

Unit-I

Introduction to Python: Introduction to Python, History, Installation and Working, Understanding variables, basic operators, and blocks. Declaring and using Numeric and string data type, defining list and list slicing, Use of Tuple data type, working with sequence. Flow Control: Conditional blocks using if, else and else if, loops in python for loop, while loops in python, Loop manipulation using pass, continue, break and else Programming.

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Unit-II

Python Functions, Modules and Packages: Organizing python codes using functions, modules. Importing own module as well as external modules, Understanding Packages, Powerful Lamda function. Python String, List, tuple, set and Dictionary Manipulations:

Unit-III

Python Object Oriented Programming –Concept of class, object and instances, Constructor, class attributes and destructors, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support. Multithreading: Understanding threads, forking threads, synchronizing the threads, Programming using multithreading. Working with System (sys Module), Working with Operating System (os module).

Unit-IV

Python File Operation: Reading and Writing files in python, read functions and write functions, manipulating file pointer using seek, Programming using file operations. Python Regular Expression: pattern matching and searching using regex in python, Real time parsing of networking or system data using regex, Password, email, URL validation using regular expression

Unit-V

Python Exception Handling: Avoiding code break using exception handling, Handling and helping developer with error code, Built-in exception. Database Interaction**:** SQL Database connection using python, Creating and searching tables, Reading and storing config information on database, Programming using database connections

Course Outcomes: At the end of this course, the students will able to do the following:

1. To understand data and the operations that can be applied to each data type
2. To write programs that get input, perform calculations, and provide output
3. To understand the OOPs concepts with respect to fourth generation language
4. To write well designed and well documented programs that is easily maintainable.
5. To test and debug programs (find out what is wrong and fix it)**.**

Text Books:

1. **R. Nageswara Rao**, "Core Python Programming", Dreamtech.
2. **Wesley J. Chun.,** "Core Python Programming", -2nd Edition Prentice Hall.
3. **Kenneth A. Lambert**, "The Fundamentals of Python: First Programs", 2011, Cengage Learning,

Refercence Books:

1. **Luke Sneeringer,** "Professional Python", Wrox.
2. **John V Gutttag.,** "Introduction to Computation and Programming using Python", PHI.
3. **Allen B. Downey,** "Think Python", Green Tea Press, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Python Programming Lab **Max Marks: 50,Credits: 01[0-0-2]**
Course Code: OEC-ECE-431/PCC-CSE-431 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Lab Objectives:

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

List of Programs:

1. Write a program to demonstrate different number datatypes in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and accessing substring from a string.
4. Write a python script to print the current date in following format
5. Write a python script to use string methods
6. Write a python program to create, append and remove lists in python.
7. Write a program to demonstrate working with tuples in python
8. Write a program to demonstrate working with dictionaries in python
9. Write a program to check whether a number is oven or odd using if condition
10. Write a program to demonstrate for loop
11. Write a program to demonstrate while loop
12. Write a program to display prime numbers between 50 to 60
13. Write a program to display Fibonacci series
14. Write a program to display Armstrong number
15. Write a program to display address of variables
16. Write a program to implement Function in python
17. Function call with tuple and dictionary
18. Write a program to implement modules
19. Write a program to implement ladders and snake game
20. Write a program to implement dir function in modules
21. Write a program to explore math module
22. Write a program to explore datetime module
23. Write a program to explore lambda functions
24. Write a program to implement linear search

COURSE OUTCOME: Upon completion of the course, students will be able to:

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Course Title: Renewable Energy Source **Max. Marks: 100**
Course code: OEC-ECE-622/PCC-EE-421 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The course is designed to give knowledge of various renewable energy sources, systems and applications in the present context and need.

Detailed Contents:

Unit-I

Energy Scenario in India, Renewable and Non-renewable Energy sources, Causes of Energy Scarcity, Solution to energy Scarcity, Need for Renewable Energy, Advantages and Disadvantages of Renewable energy, Renewable Energy statistics worldwide and India.

Unit-II

Solar energy, solar photovoltaic, PV Technologies-Amorphous, monocrystalline, polycrystalline, V-I characteristics of a PV cell, PV module, array, Maximum Power Point Tracking (MPPT) algorithms, Concentrated Solar Power, types of collectors, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, Application of Solar Power, Economic Policies to Promote Solar Energy.

Unit-III

Introduction, Electricity Generation using Wind Energy Generators (WEG), Evaluating Wind Turbine Performance, Wind Potential, Wind Energy in India, Wind Turbine Size and Power Ratings, Advantages of Wind-Generated Electricity, Cost Issues, Environmental Concerns, Supply and Transport Issues.

Unit-IV

Bio energy, Types of Bio Gas Plants, tidal energy, classification of Tidal Plants, ocean thermal energy systems, Open OTEC Cycle, Closed OTEC Cycle. Introduction to Magneto Hydro Dynamics (MHD) Power & fuel cells.

Unit-V

Energy storages: Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome:

After learning the subject, student will be able to:

CO1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources

CO2. Demonstrate the knowledge of physics of solar power generation and the associated issues.

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CO3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.

CO4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.

CO5. Demonstrate the ways by which energy can be stored in different forms.

Text Books/ References:

1**. S. P. Sukhatme and J. K.** Nayak Solar Energy: Principles of Thermal Collection and Storage, , McGraw-Hill Education

2. **John A. Duffie, William A. Beckman** Solar Engineering of Thermal Processes, , John Wiley, New York

3. **ShobhNath Singh** Non-conventional energy resources, Pearson India

4. **Soteris Kalogirou** Solar Energy Engineering, Elsevier/Academic Press.

5. **Frank Krieth& John F Kreider** Principles of Solar Energy, John Wiley, New York

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

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Course Title: Renewable Energy Sources Lab. **Max. Marks: 50**
Course Code: OEC-ECE-432/PCC-EE-433
University Exam: 25
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: To understand the working of various renewable energy resources.

List of Experiments:

1. Study of the voltage and current of solar cells.
2. Study of voltage and current of the solar cells in series and parallel calculation.
3. Study of both I-V characteristics and the power curve to find the MMP and efficiency.
4. To calculate the efficiency of solar cell.
5. Study of the application of solar cells of charging Ni-Cd battery so that the loads can be used while the module is unexposed to light.
6. Study of the application of solar cells of providing electrical energy to the domestic appliances such as lamp, fan and radio.
7. Installation of wind turbine set up and measurements of wind energy based DC voltage and current.
8. Measurement of voltage and current of wind energy based DC supply with the change in angle of blades.
9. Measurement of V-I (voltage and current) of wind energy based DC supply with change in direction of wind.
10. Measurement of V-I (voltage and current) of wind energy based DC supply with change in speed of wind imposed on the blade.
11. Study of the application of wind energy based DC supply of changing the Ni-Cd battery so that the load can be used even while the module is unexposed to wind.
12. Study of the application of wind energy based DC supply of providing electrical energy to the domestic application such as lamp, fan FM receiver etc.

Laboratory Outcome:

Student will

CO1. Understand the V-I characteristics of Solar cell.
CO2. Able to evaluate MMP and efficiency.
CO3. Able to understand the installation of wind turbine.
CO4. Able to measure V-I of wind energy based DC supply but changing various means.
CO5. Able to understand the application of wind energy based DC supply system.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

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Course Title: Unix / Shell Programming **Max. Marks: 100**
Course code: OEC-ECE-623/PCC-CSE-422 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, overview of the concept of buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipesystem call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes: process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control: process creation, signals, process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter Process communication, process tracing, network communication, sockets, Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores.

Course Outcomes:

At the end of this course, the students will able to do the following:

Course Outcomes

- **CO1.** Understanding the concept of shell programming
- **CO2.** Understanding the working of kernel and implementing them.
- **CO3.** Implementing the system calls, process management, and inter process communication
- **CO4.** Understand Shell Programming and its implementation.
- **CO5.** Understanding Semaphores along with interprocess communication.

Text Books:

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1. **Maurice J Bach**., The design of the UNIX operating system, Prentice-Hall, 1986.

2. **Raymond S. Eric**, The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata**, Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987

2. **Rochkind,** Advanced Unix Programming.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title Unix/Linux & Shell Programming Lab. **Max. Marks: 50**
Course Code: OEC-ECE-433/PCC-CSE-433 **UniversityExam:25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab Objective: The lab course will address the demand for Information technology professionals with UNIX training and experience.

List of Experiments:

1. Using the visual editor (vi) and the Pico editor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administration issues.
8. Practicing various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web server configuration.

Lab Outcomes: Upon completion of this course, the student will be able to:

1. Run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. Run C / C++ programs on UNIX.
3. Do shell programming on UNIX OS.
4. Understand and handle UNIX system calls.

Note: This is only the suggested list of experiments. Instructor may frame additional experiments relevant to the course contents

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OPEN ELECTIVE-3

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Course Title: Artificial Intelligence **Max. Marks: 100**
Course code: OEC-ECE-721/PCC-CSE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of the course is to introduce the basic concept of Artificial Intelligence. The course is appropriate both, for students of computer science & engineering who wish to acquire general understanding of Artificial Intelligence as well as for students preparing for more advanced courses and research in Artificial Intelligence

Unit- I

Introduction to Artificial Intelligence; Foundation and history of Artificial Intelligence, intelligent agents, structure of intelligence agents; Knowledge based agent and environments.

Unit- II

Knowledge representation hypothesis, Knowledge levels, knowledge classification, Knowledge representation schemas; Logic Based, Procedural, Network and Structural representations.

Unit- III

Introduction to LISP, Syntax and Numeric Functions, Basic list manipulation functions in LISP, Functions, Predicate and Conditionals, Input, Output and Local Variables, Iteration and Recursion.

Unit- IV

Searching in problem solving, problem solving agents; Uninformed search strategies, Breadth first search, Iterative deepening search, Bidirectional search, Informed search strategies; Action and path costs, heuristic functions, Greedy best first Search, A* search, IDA* search.

Unit- V

Introduction to planning & Machine Learning: Planning components, planning in situational calculus, practical planners, non-linear planning, Baye's Rule, Supervised and Unsupervised learning, Introduction to artificial neural network, Perceptron and perceptron learning rules.

Course Outcomes:

At the end of this course, the student will be able to do following:

- **CO1.** To learn different forms of logic
- **CO2.** Deal with inconsistencies and uncertainties of logic
- **CO3.** Be familiar with informed and uniformed searching techniques

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CO4. To study different matching techniques

CO5. To learn pattern recognition and expert systems

Text Books:

1. **Rich Night**, Introduction to Artificial Intelligence, 2nd Edition, 2005, TMH.
2. **Stuart Russel & Peter Norvig**, Artificial Intelligence, A modern Approach, 2nd Edition 2006, PHI.

Reference Books:

1. **Nilson and Springer**, Principles of Artificial Intelligence.
2. **Dan W. Patterson**, Introduction to Artificial Intelligence and Expert Systems, Indian Reprint 2005, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Power System-II **Max. Marks: 100**
Course Code: OEC-ECE-722/PCC-EE-622 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This subject familiarizes a student with the power system behavior and performance during normal and abnormal conditions.

Detailed Contents:

Unit-I

Per unit Representation, one line diagram and impedance diagram. Turbines and Speed-Governors, Frequency dependence of loads, Droop Control and Power Sharing. Automatic Generation Control.

Unit-II

Symmetrical components of a three phase system, Evaluation of components, Three-phase power in terms of symmetrical components, Sequence impedances. Sequence network. Calculation of fault currents for unsymmetrical faults: Single Line to Ground, Line-to-Line, Double Line to Ground faults and for symmetrical 3-phase balanced faults,

Unit-III

Load flow analysis: Introduction, Bus classifications, Nodal admittance matrix (YBUS), Development of load flow equations. Load flow solution using Gauss-Seidel and Newton Raphson method, Approximation to N-R method. Calculation of line flows and line losses.

Unit-IV

Power System Stability, Transient and Steady State stability, Power Angle Equation, Swing Equation, Equal Area Criterion of Stability, Critical clearing angle, Factors affecting transient stability. Active and Reactive power control.

Unit-V

Travelling waves on transmission lines: Reflection and refraction coefficient, open-end line, Short-circuited line, Line terminated through impedance. Line terminated through cable, Surge Impedance loading, Bewley Lattice Diagrams.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the importance of Per unit representation in Power System

CO2. Understand various faults in Power System

CO3. Understand methods for Load Flow analysis

CO4. Understand the importance of Power System Stability

CO5. Understand the phenomenon of Travelling Waves on transmission lines

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.
2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.

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3. **A. R. Bergen and V. Vittal**, "Power System Analysis", Pearson Education Inc., 1999.
4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.
5. **B. M. Weedy,B. J. Cory, N. Jenkins**, J. Ekanayake and G. Strbac, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Internet and Web Technologies | **Max. Marks: 100**
Course code: OEC-ECE-723/PCC-ITE-522 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The objective of this subject is to understand about Website Development and internet.

Unit-I

Internet & Web: History and growth of Internet and Web, Basics of Clients, Servers, and Communications, Introduction to WWW, http, Web Architecture, Web Browsers and Search Engines, Static, Dynamic and active websites and their applications, Symantec Web Technology, web hosting.

Unit-II

HTML: Introduction to HTML, Overview, Tags, Elements, Attributes, Heading, Paragraphs, Styles, Colours, Links, Images, Tables, frames and forms, Overview of DHTML, Overview of Extensible Mark-up Language(XML).

Unit-III

Cascading Style Sheets (CSS): Text or font properties, background, border, margin, padding properties, Align, Navigation Bar, Drop downs, Image Gallery, page layout properties and user interface properties, JavaScript: Overview, forms processing, objects, functions, arrays, popup and HTML DOM, AJAX.

Unit-IV

Security: Principles of web security, security threats to websites, attacks on websites and their mitigation, Cryptographic tools, Digital certificates, Digital Signatures, Secure Socket Layer, Network Security: Firewalls, IP Security, Virtual Private Networks.

Unit-V

Introduction to Server Side Programming: PHP, Overview, variable, Control statements, Arrays, functions and forms, advanced PHP. MySQL Database Connectivity.

Course Outcomes:

The Students should be able to

- **CO1.** Develop simple static websites.
- **CO2.** Static websites with CSS.
- **CO3.** Dynamic websites using java Scripting.
- **CO4.** Dynamic website with server side scripting using PHP.
- **CO5.** Address various web security related issues

Text Books:

1. Thomas Powell, Complete Reference HTML/XHTML.
2. S. Achyut Godbole and Atul Kahate, Web Technologies, Tata McGraw Hill.

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REFERENCE BOOKS:

1. H. M. Deitel, P. J. Deitel and T. R. Nieto, Internet and World Wide Web : How to Program, Pearson Education, 2000.
2. Xavier C., Web Technology & Design, New Age International Publishers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Course Title: Disaster Preparedness & Planning **Maximum Marks: 100**
Course Code: OEC-ECE-724/PCC-CE-325 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences and to ensure skills and abilities to analyze potential effects of disasters and of the strategies and met to deliver public health response to avert these effects.

UNIT: 1

Disaster and Hazards

Definition of vulnerability, risk, capacity, impact, prevention, mitigation. ecological fragility; Factors affecting vulnerability; Sustainable and environmental-friendly recovery; Reconstruction and development.

UNIT: II

Classification of Disasters

Natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.), Causes of natural disasters; Man-made disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills), Causes and concern of man-made disasters.

UNIT III:

Disaster Impacts

Disaster impacts- Global (Climate change), regional (urban disasters) and local- environmental impacts (physical, social, ecological, economic, political, etc.), health impacts, psycho-social issues; demographic aspects (gender, age, special needs), Impact evaluation and analysis.

UNIT IV:

Disaster Risk Reduction: Disaster management cycle phases; prevention, mitigation, preparedness, relief and recovery; Structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; Early warning systems, Post-disaster environmental response, Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT V:

Disasters management and control: Management of natural disasters (Earthquake, flood and drought), Various components and their functions; Man-made disasters (Industrial and nuclear disaster)-management and control, preventives measures, regulatory aspects.

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Course Outcomes: At the end of completion of subject students will able to understand:

1. Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
2. Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.
3. Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
4. Capacity to manage the Public Health aspects of the disasters.
5. Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Text Books:

1.http://ndma.gov.in/ (Home page of National Disaster Management Authority). 64

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs). 3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

Reference Books:

3.Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.

4. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each **Course**

Title: Internet of Things **Max. Marks: 100**
Course code: OEC-ECE-725/PEC-CSE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course objectives:

The main objectives of this course are:

- To assess the vision and introduction of IoT.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.
- To Understand State of the Art - IoT Architecture.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Unit-I

Introduction to Internet of Things (IoT): Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.

Unit-II

Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.

Unit-III

IP as the IoT Network Layer: The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.

Unit-IV

Data and Analytics for IoT: An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment.

Unit-V

IoT Physical Devices and Endpoints: Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture. Smart City Security Architecture, Smart City Use-Case Examples.

Course Outcomes:

After completion of this course, the students will able to do following:

CO1. Interpret the vision of IoT from a global context.

CO2. Compare and contrast the use of Devices, Gateways and Data Management in IoT.
CO3. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO4. To study and analyse data and to understand the security issues in IoT
CO5. To study IoT physical devices and end points and to understand the communications between components

Textbook:

1. **Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle**, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence**",** 1st Edition, Academic Press, 2014.

Reference Books:

1. **Vijay Madisetti and ArshdeepBahga,** "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
2. **Francis daCosta,** "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

OPEN ELECTIVE-4

Prof Asif Husain	Vishal Puri	Mehmood-ul-Hassan	Haider Mehraj
(Dean SoET)	(Head, ECE)	(A.P., ECE)	(A.P., ECE)

Course Title: Neural Networks **Max. Marks: 100**
Course code: OEC-ECE-821/PEC-CSE-826 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The principal objective of this subject is to introduce students to neural networks and fuzzy theory from an engineering perspective

Unit-I

Introduction: Historical Perspective, Basic Neurobiology, Why Artificial Networks, Network Architectures, the Tasks Neural Networks Can Perform, Characteristics of Neural Networks

Unit-II

Basic Neuron Models: Mcculloch-Pitts Model, Radial Basis Function Model, etc, Learning Algorithms. Matlab Simulation Exercises.

Unit-III

Basic Neural Network Models: The Hebbian Hypothesis. Single-Layered Neural Networks, Multilayer Perceptron, Nearest Neighbor Based Multilayer Perceptron, Training of Artificial Neural Networks

Unit-IV

Basic Learning Algorithms: Supervised Learning, Constructive Algorithms, Single-Hidden Layer Algorithms. The Upstart Algorithm. The Cascade Correlation Algorithm. Neural Networks and Temporal Sequences. Sequence Recognition. Sequence Generation. Unsupervised Learning. Competitive Learning. The Back-Propagation Algorithm, Self-Organization Learning, Winner-Take-All Competitive Learning, Evolutionary Learning.

Unit-V

Applications: Character Recognition, Signal Restoration, Pattern Recognition. Matlab Simulation Exercises.

Course Outcomes:

At the end of the course, students should be able to understand and appreciate:

- **CO1.** The role of neural networks in engineering, artificial intelligence, and other areas.
- **CO2.** Understanding of basic neural network models like Mcculloch-Pitts Model, Radial Basis Function Model, resistive networks for vision models, complex dynamical learning models.
- **CO3.** Understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
- **CO4.** Have knowledge of sufficient theoretical background to be able to reason about the behavior of neural networks.
- **CO5.** Able to evaluate whether neural networks are appropriate to a particular application.

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CO6. Able to apply neural networks to particular applications, and to know what steps to take to improve performance.

Text Books:

1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS PublishingCompany, (2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.

Reference Books:

1. **Valluru Rao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co*(1998)*
2. **Freeman**, Neural Networks, Pearson Publication (2003).

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Energy Audit and Management **Max. Marks: 100**
Course code: OEC-ECE-822/PEC-EE-623 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: This course gives an overview of various aspects of conservation, management & audit of electrical energy.

Unit-I

Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change. Energy Conservation, Energy Conservation Act and its features.

Unit-II

Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

Unit-III

Energy Efficiency in Electrical Systems: Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

Unit-IV

Energy Efficiency in Industrial Systems: Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities.

Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling towers.

Unit-V

Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lighting controls, energy saving potential of each technology.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- **CO1.** Understand the current energy scenario and realize the need for new reforms to efficiently manage the energy resources.
- **CO2.** Learn various auditing techniques used for proper energy management.
- **CO3.** Realize how energy conservation could be done in Electrical Systems by managing the energy losses and malpractices.
- **CO4.** Realize how energy conservation could be done in Industrial Systems by finding out the factor affecting the performance of various industrial devices and mitigating the same.
- **CO5.** How electrical energy management could be achieved using new energy efficient devices.

Text/Reference Books:

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects
2. **S. C. Tripathy**, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Industrial Waste Management **Max. Marks: 100**
Course code: OEC-ECE-823/PEC-CE-628 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To impart knowledge for the various techniques employed for characterisation and quantification of waste/wastewater generated by various industrial activities, and safe disposal of treated waste/wastewater employing appropriate treatment methods in to the environment.

Unit-I

Industrial wastewaters, nature and effects, water pollution and problem pollutants
Stream sanitation, de-oxygenation and self-purification in streams

Unit-II

Sources and characteristics of industrial wastewaters, sampling and analysis In-plant waste control and water reuse

Unit-III

Different methods of treatment, aeration, sedimentation, floatation and coagulation, aerobic and anaerobic digestion

Unit-IV

Ion exchange, reverse osmosis, adsorption, combined biological, physical and chemical process

Unit-V

Application of treatment methods to some selected industries. Introduction to ISO: 14,000, Life cycle analysis etc.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- **CO1.** Characterize and quantify wastewater generated from various industries
- **CO2.** Knowledge of sources and characterstic of industrial waste waters
- **CO3.** Knowledge of different methods of treatments of waste water
- **CO4.** Knowledge of different methods of treatments of waste water
- **CO5.** Design the various process for the treatment of the Industrial wastewater.

Textbook:

1. Waste Water Engineering: Treatment and Reuse, Metcalf & Eddy, T.M.H. Publication. Environmental Engineering by Peavy H.S, Rowe D.R. and Tchobanoglous G, Tata McGraw Hills, New Delhi.

Reference Books:

1. G.M. Fair, J.C. Geyer, D.A. Okan, Elements of Water Supply and Wastewater Disposal, John Wiley and Sons Inc.
2. Terence, J. McGhee Water Supply and Sewerage, McGraw Hill Book Co.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Course Title: Data Mining and Warehousing **Max. Marks: 100**
Course code: OEC-ECE-824/PEC-ITE-625 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To impart knowledge of data warehousing and data mining for Business Processes.

Unit-I

Data Warehousing: Data warehousing Components, building a Data warehouse, mapping the Data Warehouse to a Multiprocessor Architecture, DBMS Schemas for Decision Support, Data Extraction, Clean-up, and Transformation Tools, Metadata.

Unit-II

Business Analysis: Reporting and Query tools and Applications, Tool Categories, The Need for Applications, Cognos Impromptu, Online Analytical Processing (OLAP), Multidimensional Data Model, OLAP Guidelines, Multidimensional versus Multi-relational OLAP, Categories of Tools, OLAP Tools and the Internet.

Unit–III

Data Mining: Introduction, Data, Types of Data, Data Mining Functionalities, Interestingness of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Data Warehouse, Issues –Data Pre-processing.

Unit-IV

Association Rule Mining and Classification: Mining Frequent Patterns, Associations and Correlations, Mining Methods, Mining Various Kinds of Association Rules, Correlation Analysis, Constraint Based Association Mining, Classification and Prediction, Basic Concepts, Decision Tree Induction, Bayesian Classification, Rule Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods - Prediction

Unit–V

Clustering and Applications and Trends In Data Mining: Cluster Analysis, Types of Data, Categorization of Major Clustering Methods, K- means, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model-Based Clustering Methods, Clustering High Dimensional Data Constraint, Based Cluster Analysis, Outlier Analysis, Data Mining Applications

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Course Outcomes:

- **CO1.** Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
- **CO2.** Describe the various architectures and main components of a data warehouse.
- **CO3.** Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.

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Text Books:

1. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Data Mining: Concepts & Techniques - Jiawei Hun, Micheline Kamber, Academic Press, by Morgan Kanfman Publishers, 2001.

Reference Books:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data Mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Machine Learning **Max. Marks: 100**
Course code: OEC-ECE-825/PEC-CSE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course objectives:

The main objectives of this course are:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

Unit-I

Data: the backbone for making machine learn, Data pre-processing techniques, transformation, feature extraction and interpretation

Concept Learning: Overview of Issues regarding data sources, Diverse data formats

Unit-II

Supervised Machine Learning: Supervised Machine Learning concepts, techniques and algorithms, Decision Trees, KNN (K-nearest neighbours), SVM (Support vector machines), Neural Network Learning: Perceptions and gradient descent back propagation, LMS, Logistic regression, Supervised Machine learning applications in real life.

Unit-III

Probability based methods and dimensionality reduction: Cross Validation, Training and testing, Dimensionality reduction techniques, Model selection and feature selection, IDA, ICA, PCA, Bayesian Approaches: The basics Expectation Maximization, Hidden Markov Models.

Unit-IV

Un-Supervised Machine Learning: Unsupervised learning: Clustering K-means, EM (Expectation Maximization and Minimization), Mixture of Gaussians, Factor analysis, Hierarchical clustering, Un-Supervised Machine learning applications in real life.

Unit-V

Optimization techniques for Machine Learning: Genetic Algorithms (GA), Particle Swarm Optimization (PCO), Ant colony optimization (ACO), Ensemble learning.

Course Outcomes:

After completion of this course, the students will able to do following:

CO1. Ability to formulate machine learning techniques to respective problems.
CO2. Understand the basic concepts such as decision tree and neural networks.
CO3. Apply machine learning algorithms to solve problems of moderate complexity.

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CO4. Apply supervised and unsupervised learning to analyse/ interpret data.

CO5. Apply optimization techniques to solve real life problems.

Textbook:

1. Tom Michel, Machine Learning. Mc Graw Hill. 1997.
2. Trevor Hus tie, Robert Tibshirani & Jerome Friedman. The Elements of Statically Learning, Springer Veriag, 2001.

Reference Books:

1. Chris Bishop, "Pattern Recognition and Machine Learning", Cambridge, February 2006.
2. Jiawei Han Micheline Kamber Jian Pei, "Data Mining: Concepts and Techniques", Morgan Kaufmann, 3rd Edition, 2011.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Bio-Informatics **Max. Marks: 100**
Course code: OEC-ECE-826/PEC-CSE-828 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems.

Unit-I

Introduction to Bioinformatics and Computational Genomics, Biological Databases, Kinemages for Biological Structure, Dynamic Programming Sequence Alignment, BLAST, FASTA.

Unit-II

3D Structure Computations, NMR, Xtallography, RNA Secondary Structure, Introduction to Microarrays, Review of Structural Genomics, Microarray Clustering and Classification, Vector Machine Applications in Bioinformatics.

Unit-III

Terminologies and Ontologies, Multiple Sequence Alignment, 1D Motifs, Algorithms and Databases, 3D Structure Alignment, MUSTA Algorithm for Geometric Hashing and Multiple Alignments.

Unit-IV

Hidden Markov Models, Molecular Energetics and Dynamics, Protein Structure Prediction, Genetic Networks, Gene Finding Algorithms.

Unit-V

Comparative Genomics Algorithms, Genome Alignment, Phylogenetic Algorithms, Natural Language Processing, Proteomics, 3D Motifs & Final Thoughts.

Course Outcomes:

At the end of this course, the students will be able to do the following:

- **CO1.** Explain the basic principles that underpin Bioinformatics analyses, and apply these principles when analyzing biological data;
- **CO2.** Survey a selected field within Bioinformatics, synthesize information from primary literature, and coherently report your findings in a written document;
- **CO3.** Analyze biological data using a variety of Bioinformatics tools; and
- **CO4.** Interpret correctly the outputs from tools used to analyze biological data and make meaningful predictions from these outputs.

Text Books:

1. **David Mount**, Bio-informatics: Sequence and Genome analysis, 2ed, Cold Spring Harbor Laboratory Press.

Reference Books:

1. **Srinivas**, Bio-metrics: A Modern Approach, PHI.
2. **Bergen**, Bio-informatics Computing, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Course Title: Wireless Networks **Max. Marks: 100**
Course code: OEC-ECE-827/PEC-CSE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The aim of the subject is to make the students aware of the latest technologies in the field of Wireless Networks.

Unit-I

Cellular wireless Networks: Introduction: Applications, Replacement of wired Networks, principles of cellular networks, first generation analog, second generation TDMA, second generation CDMA and third generation systems.

Unit-II

Satellite communications: History, Applications, satellite parameters & configurations-GEO, LEO, MEO, capacity allocation (frequency division, time division), routing, localization, Handover.

Unit-III

Wireless LANS: Infrared LANS, spread spectrum LANS, narrowband microwave LANS, IEEE 802.11 wireless LAN standard, Bluetooth and IEEE 802.15, wireless local loop.

Unit-IV

Mobile Network Layer: Mobile IP, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration, tunnelling and encapsulation, optimizations.

Unit-V

Ad Hoc wireless Networks: Ad Hoc networks, Difference between cellular and Ad Hoc wireless networks, applications, technical & research challenges, Important issues in Ad Hoc wireless networks, the need for MAC, MAC layer protocols for Ad Hoc Wireless Networks, introduction to quality of service (QoS) in Ad Hoc wireless networks.

Course Outcomes:

On successful completion of this unit students will be able to:

- **CO1.** Identify the basic concept of wireless networks, channel coding, and cellular concepts;
- **CO2.** Compare and contrast LEO, MEO and GEO. Routing and handover in satellite communication
- **CO3.** Understand various wireless LAN technologies
- **CO4.** Understand the terminologies in mobile network layers and the process of packet discovery and registration in network layer.
- **CO5.** Compare and contrast between cellular and Ad Hoc wireless networks, areas of its applications and challenges

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Text Books:

1. **Stallings William**, Wireless Communications & Networking, PHI.
2. **Pahlavan Kaven**, Principles of Wireless Networks, Pearson Education India.

References:

1. **Nicopolitidis, H. S. Obaidat,** Wireless Networks, John Wiley.
2. **Stoimenovic Ivan**, Handbook of Wireless Networks & Mobile Computing, CRS Press.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

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Baba Ghulam Shah Badshah University
Rajouri (J&K)-185234

Syllabus I to VIII Semester
B. Tech. Degree Course

Department of Electrical Engineering
School of Engineering& Technology
Baba Ghulam Shah Badshah University
Rajouri (J&K)-18523

Dr. S. N. Mughal **(Head E.E.)**
Mr. Tasaduq Hussain **(A.P., EE)**
Dr. Ahmed Riyaz **(A.P., EE)**
Prof. Asif Husain **(Dean, SOET)**

Electrical Engineering Course structure 2022 onwards

Syllabus Content

Semester-I									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
BSC-EE-121	Mathematics-I	3	40	60	100	3	1	0	4
ESC-EE-121	Basic Electrical Engineering	3	40	60	100	3	1	0	4
HSMC-EE-121	Communication Skills	3	40	60	100	2	0	0	2
ESC-EE-122	Engineering Mechanics	3	40	60	100	2	1	0	3
ESC-EE-123	Computer Fundamentals	3	40	60	100	3	1	0	4
MC-EE-121	Indian Constitution*	3	40	60	100	2	0	0	0
Total			**200**	**300**	**500**				**17**
Laboratory Courses									
ESC-EE-131	Basic Electrical Engineering Lab	2	25	25	50	0	0	2	1
HSMC-EE-131	Communication Skills Lab	2	25	25	50	0	0	2	1
ESC-EE-132	Engineering Mechanics Lab	2	25	25	50	0	0	2	1
ESC-EE-133	Computer Fundamentals Lab.	2	25	25	50	0	0	2	1
ESC-EE-134	Workshop Practices	2	50	-	50	0	0	2	1
MC-EE-131	Induction Program**	-	-	-	-	0	0	0	0
Total			**150**	**100**	**250**				**5**
Total (Theory + Lab)			**350**	**400**	**750**	**Total Credits**			**22**

N.B: 1. * Indian constitution course is non-credits and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks

**2. ****Induction training is also non-credits and the student has to get at-least minimum pass marks to qualify the subject. The student has to qualify this course by attending the training which will be verified by concerned teacher.

Semester-II									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
BSC-EE-221	Mathematics-II	3	40	60	100	3	1	0	4
ESC-EE-221	Basic Electronics Engineering	3	40	60	100	3	1	0	4
BSC-EE-222	Engineering Physics	3	40	60	100	3	1	0	4
BSC-EE-223	Engineering Chemistry	3	40	60	100	3	1	0	4
ESC-EE-222	C-Programming	3	40	60	100	3	1	0	4
MC-EE-221	Environmental Science*	3	40	60	100	2	0	0	0
Total			**200**	**300**	**500**				**20**
Laboratory Courses									
ESC-EE-231	Basic Electronics Lab.	2	25	25	50	0	0	2	1
BSC-EE-231	Engineering Physics Lab.	2	25	25	50	0	0	2	1
BSC-EE-232	Engineering Chemistry Lab.	2	25	25	50	0	0	2	1
ESC-EE-232	C-Programming Lab	2	25	25	50	0	0	2	1
ESC-EE-233	Engineering Graphics Lab**	3	40	60	100	1	0	4	3
Total			**140**	**160**	**300**				**7**
Total (Theory + Lab)			**275**	**375**	**800**	**Total Credits**			**27**

**N.B: 1. ***Environmental science course is non-credits, and the student has to get at-least minimum pass marks to qualify the subject. Non-credits course marks are not included in total marks

2. ** The examination pattern of engineering graphics shall be same as of other theory courses.

Semester-III									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
BSC-EE-321	Mathematics-III	3	40	60	100	3	1	0	4
PCC-EE-321	Electromagnetic Fields and Waves	3	40	60	100	3	0	0	3
PCC-EE-322	Network Analysis & Synthesis	3	40	60	100	3	1	0	4
PCC-EE-323	Digital Electronics	3	40	60	100	3	1	0	4
PCC-EE-324	Electrical Engineering Materials	3	40	60	100	3	0	0	3
OEC-EE-(---)	Open Elective courses I	3	40	60	100	3	0	0	3
Total			**240**	**360**	**600**				**21**
Laboratory Courses									
PCC-EE-331	Digital Electronics Lab.	2	25	25	50	0	0	2	1
PCC-EE-332	Network Analysis & Synthesis Lab.	2	25	25	50	0	0	2	1
OEC-EE-333	Open Elective courses-I Lab	2	25	25	50	0	0	2	1
Total			**75**	**75**	**150**				**3**
Total (Theory + Lab)			**315**	**435**	**750**	**Total Credits**			**24**

Open Elective Courses-I

S. No.	Code	Title
1.	OEC-EE-321/PCC-CSE-321 & OEC-EE-331/PCC-CSE-331	Data Structures Using C & Data Structures Using C Lab
2.	OEC-EE-322/PCC-CSE-322 & OEC-EE-332/PCC-CSE-332	Object Oriented Programming Using C^{++} & Object Oriented Programming Using C^{++} Lab
3.	OEC-EE-323/PCC-CE-323 & OEC-EE-333/PCC-CE-332	Introduction to Fluid Mechanics & Fluid Mechanics Lab

Semester-IV									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
BSC-EE-421	Numerical Techniques	3	40	60	100	3	1	0	4
PCC-EE-421	Renewable Energy Sources	3	40	60	100	3	1	0	4
PCC-EE-422	Electrical Machines-I	3	40	60	100	3	1	0	4
PCC-EE-423	Electrical Measurements-I	3	40	60	100	3	0	0	3
OEC-EE-(--)	Open Elective courses-II	3	40	60	100	3	0	0	3
Total			**200**	**300**	**500**				**18**
Laboratory Courses									
PCC-EE-431	Computer-Aided Simulation Lab.	2	25	25	50	0	0	2	1
PCC-EE-432	Renewable Energy Sources Lab.	2	25	25	50	0	0	2	1
OEC-EE-(--)	Open Elective courses-II Lab	2	25	25	50	0	0	2	1
Total			**75**	**75**	**150**				**3**
Total (Theory + Lab)			**275**	**375**	**650**	**Total Credits**			**22**

At the end of semester IV, students are required to attend an Industrial Training for 6 weeks duration, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester V University Exam. Evaluation of Industrial Training shall be conducted during semester V.

Open Elective Courses II

S. No.	Course Code	Title
1.	OEC-EE-421/PCC-CSE-422 & OEC-EE-431/PCC-CSE-431	Python Programming & Python Programming Lab
2.	OEC-EE-422/PCC-CSE-425 & OEC-EE-432/PCC-CSE-433	Unix /Linux and Shell Programming & Unix /Linux and Shell Programming Lab
3.	OEC-EE-423/PCC-ECE-424 & OEC-EE-433/PCC-ECE-433	Linear Integrated Circuits & Pulse Switching & Linear Integrated Circuits Lab

Semester-V									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
PCC-EE-521	Power System-I	3	40	60	100	3	1	0	4
PCC-EE-522	Signals and Systems	3	40	60	100	3	0	0	3
PCC-EE-523	Electrical Machines-II	3	40	60	100	3	1	0	4
PCC-EE-524	Applied Electronics	3	40	60	100	3	1	0	4
OEC-EE-(---)	Open Elective courses-III	3	40	60	100	3	0	0	3
Total			**200**	**300**	**500**				**18**
Laboratory Courses									
PCC-EE-531	Electrical Machines Lab.	2	25	25	50	0	0	2	1
PCC-EE-532	Applied Electronics Lab.	2	25	25	50	0	0	2	1
PROJ-EE-531	Industrial Training-I	-	50	-	50	0	0	0	1
PROJ-EE-532	Seminar	-	100	-	100	0	0	0	2
Total			**200**	**50**	**200**				**5**
Total (Theory + Lab)			**400**	**350**	**750**	**Total Credits**			**24**

Open Elective Courses III

S. No.	Course Code	Title
1.	OEC-EE-521/PEC-CSE-522	Cyber-crime and Laws
2.	OEC-EE-522/PEC–CSE-722	Internet of Things
3.	OEC-EE-523/PEC-ECE-521	Industrial Electronics
4.	OEC-EE-524/PEC-ECE-725	Biomedical Instrumentation
5.	OEC-EE-525/PCC-CE-325	Disaster Preparedness and Planning
6.	OEC-EE-526/PCC-CE-326	Biology & Life Science

Semester-VI									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
PCC-EE-621	Power Electronics	3	40	60	100	3	0	0	3
PCC-EE-622	Power System-II	3	40	60	100	3	1	0	4
PCC-EE-623	Electrical Measurement-II	3	40	60	100	3	1	0	4
PCC-EE-624	Control System	3	40	60	100	3	1	0	4
PEC-EE-(---)	Professional Elective courses-I	3	40	60	100	3	0	0	3
Total			**200**	**300**	**500**				**18**
Laboratory Courses									
PCC-EE-631	Power System Lab.	2	25	25	50	0	0	2	1
PCC-EE-632	Electrical Measurement Lab.	2	25	25	50	0	0	2	1
PCC-EE-633	Control System Lab	2	25	25	50	0	0	2	1
Total			75	75	150				**3**
Total (Theory Lab)			275	375	650	**Total Credits**			**22**

At the end of semester VI students are required to attend an Industrial Training for 6 weeks duration, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester VII University Exam. Evaluation of Industrial Training shall be conducted during semester VII.

Professional Elective Course I

S. No.	Course Code	Title
1.	PEC-EE-621	Electrical Substation Design
2.	PEC-EE-622	Energy Audit and Management
3.	PEC-EE-623	Power Engineering
4.	PEC-EE-624	Industrial Electrical Systems
5.	PEC-EE-625	Computers in medicine

Semester-VII									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
PCC-EE-721	Power System Protection	3	40	60	100	3	0	0	3
PCC-EE-722	Electrical Drives	3	40	60	100	3	0	0	3
PCC-EE-723	Microprocessor and Interfacing	3	40	60	100	3	0	0	3
PCC-EE-724	Design of Electric Machines	3	40	60	100	3	0	0	3
PROJ-EE-721	Minor Project	-	150	-	150	0	0	0	3
PEC-EE-(---)	Professional Elective courses-II	3	40	60	100	3	0	0	3
Total			**350**	**300**	**650**				**18**
Laboratory Courses									
PCC-EE-731	Power System Protection Lab.	2	25	25	50	0	0	2	1
PCC-EE-732	Power Electronics & Drives Lab.	2	25	25	50	0	0	2	1
PCC-EE-733	Microprocessor and Interfacing Lab	2	25	25	50	0	0	2	1
PROJ-EE-731	Industrial Training-II	-	50	-	50	0	0	0	1
Total			**125**	**75**	**200**				**4**
Total (Theory + Lab)			**475**	**375**	**850**	**Total Credits**			**22**

At the start of VII semester every student shall be allotted a Minor Project under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project under the supervision of their allotted mentor. Students are required to complete the Minor Project during semester VII. Minor Project shall be evaluated internally as per university statutes by a committee consisting of:

1. Three-member committee constituted by Head of the Department
2. Coordinator(s)/Supervisor(s) of minor project/training

Professional Elective Course II

S. No.	Course Code	Title
1.	PEC-EE-721	Wind and Solar Energy systems
2.	PEC-EE-722	EHV AC and DC transmission
3.	PEC-EE-723	Control System Design
4.	PEC-EE-724	Energy Economics and Planning
5.	PEC-EE-725	Restructuring of Power systems

Semester-VIII									
Theory Courses									
Course Code	**Title**	**Scheme of Exam**				**Hrs./Week**			**Credits**
		Duration (Hrs.)	**IA**	**UE**	**Total Marks**	**L**	**T**	**P**	
PCC-EE-821	Entrepreneurship Development and Management	3	40	60	100	3	0	0	3
PROJ-EE-821	Major Project	-	300	200	500	0	0	0	9
PEC-EE-(---)	Professional Elective courses III	3	40	60	100	3	0	0	3
PEC-EE-(---)	Professional Elective courses IV	3	40	60	100	3	0	0	3
Total			**420**	**380**	**800**	**Total Credits**			**18**

After the university Exam of semester VII every student shall be allotted a Major Project pertaining to his/her stream under the supervision of an allotted mentor. Students are required to report in their respective departments to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project under the supervision of an allotted mentor. Students are required to complete the Major Project during semester VIII. Depending upon the infrastructure, Computing and other laboratories facilities the students shall be offered in house project on campus are they can complete their project work in any organization/industry outside the campus. Major Project shall be evaluated internally as well as externally as per university statues.

Professional Elective Course III & IV

S. No.	Course Code	Title
1.	PEC-EE-821	Electrical and Hybrid Vehicles
2.	PEC-EE-822	Power Quality and FACTS
3.	PEC-EE-823	Virtual Instrumentation
4.	PEC-EE-824	Neural Networks and Fuzzy systems
5.	PEC-EE-825	Optimization Techniques
6.	PEC-EE-826	Power System Transients
7.	PEC-EE-827	Line commutated active rectifiers
8.	PEC-EE-828	High voltage Engineering

Summary of Credits

Basic Science Course

S. No.	Course Code	Subject	Semester	Credits
1	BSC-EE-121	Mathematics-I	I	4
2	BSC-EE-221	Mathematics-II	II	4
3	BSC-EE-222	Engineering Physics	II	4
4	BSC-EE-231	Engineering Physics Lab	II	1
5	BSC-EE-223	Engineering Chemistry	II	4
6	BSC-EE-232	Engineering Chemistry Lab	II	1
7	BSC-EE-321	Mathematics-III	III	4
8	BSC-EE-421	Numerical Techniques	IV	4
Total Credits:				**26**

Engineering Science Course

S. No.	Course Code	Subject	Semester	Credits
1	ESC-EE-121	Basic Electrical Engineering	I	4
2	ESC-EE-131	Basic Electrical Engineering Lab	I	1
3	ESC-EE-122	Engineering Mechanics	I	3
4	ESC-EE-132	Engineering Mechanics Lab	I	1
5	ESC-EE-123	Computer Fundamentals	I	4
6	ESC-EE-133	Computer Fundamentals Lab	I	1
7	ESC-EE-134	Workshop Practices	I	1
8	ESC-EE-221	Basic Electronics Engineering	II	3
9	ESC-EE-222	C-Programming	II	4
10	ESC-EE-231	Basic Electronics Lab	II	1
11	ESC-EE-232	C-Programming Lab	II	1
12	ESC-EE-233	Engineering Graphics Lab	II	3
			Total Credits:	**27**

Humanities & Social Sciences Including Management Courses

S. No.	Course Code	Subject	Semester	Credits
1	HSMC-EE-121	Communication Skills	I	2
2	HSMC-EE-131	Communication Skills Lab.	I	1
3	HSMC-EE-821	Entrepreneurship Development & Management	VII	3
			Total Credits:	**6**

Mandatory Courses

S. No.	Course Code	Subject	Semester	Credits
1	MC-EE-121	Indian Constitution	I	0
2	MC-EE-131	Induction Program	I	0
3	MC-EE-221	Environmental Science	II	0
			Total Credits:	**0**

Program Core Courses

S. No.	Course Code	Subject	Semester	Credits
1.	PCC-EE-321	Electromagnetic Fields and Waves	III	3
2.	PCC-EE-322	Network Analysis & Synthesis	III	4
3.	PCC-EE-323	Digital Electronics	III	4
4.	PCC-EE-324	Electrical Engineering Materials	III	3
5.	PCC-EE-331	Digital Electronics Lab	III	1
6.	PCC-EE-332	Network Analysis & Synthesis Lab.	III	1
7.	PCC-EE-421	Renewable Energy Sources	IV	3
8.	PCC-EE-432	Renewable Energy Sources Lab	IV	1
9.	PCC-EE-431	Computer-Aided Simulation Lab	IV	1
10.	PCC-EE-422	Electrical Machines-I	IV	4
11.	PCC-EE-423	Electrical Measurements-I	IV	3
12.	PCC-EE-521	Power System-I	V	4
13.	PCC-EE-522	Signals and Systems	V	3
14.	PCC-EE-523	Electrical Machines-II	V	4
15.	PCC-EE-531	Electrical Machines Lab	V	1
16.	PCC-EE-524	Applied Electronics	V	3
17.	PCC-EE-532	Applied Electronics Lab	V	1
18.	PCC-EE-621	Power Electronics	VI	3
19.	PCC-EE-622	Power System-II	VI	4
20.	PCC-EE-623	Electrical Measurements-II	VI	4
21.	PCC-EE-631	Power System Lab	VI	1
22.	PCC-EE-632	Electrical Measurements Lab	VI	1
23.	PCC-EE-624	Control System	VI	4
24.	PCC-EE-633	Control System Lab	VI	1
25.	PCC-EE-721	Power System Protection	VII	3
26.	PCC-EE-731	Power System Protection Lab	VII	1
27.	PCC-EE-722	Electrical Drives	VII	3
28.	PCC-EE-732	Power Electronics & Drives Lab	VII	1

29.	PCC-EE-723	Microprocessor and Interfacing	VII	3
30.	PCC-EE-733	Microprocessors & Interfacing Lab.	VII	1
31.	PCC-EE-724	Design of Electrical Machines	VII	3
			Total Credits:	**77**

Professional Elective Courses

S. No.	Course Code	Subject	Semester	Credits
1	PEC-EE-(---)	Professional Elective courses-I	VI	3
2	PEC-EE-(---)	Professional Elective courses-II	VII	3
3	PEC-EE-(---)	Professional Elective courses-III	VIII	3
4	PEC-EE-(---)	Professional Elective courses-IV	VIII	3
			Total Credits:	**12**

Open Elective Courses

S. No.	Course Code	Subject	Semester	Credits
1	OEC-EE-(---)	Open Elective courses-I & Lab	III	4
2	OEC-EE-(---)	Open Elective courses-II & Lab	IV	4
3	OEC-EE-(---)	Open Elective courses-III	V	3
			Total Credits:	**11***

Project/Internship/ Seminar

S. No.	Course Code	Subject	Semester	Credits
1	PROJ-EE-531	Industrial Training-I	V	1
2	PROJ-EE-532	Seminar	V	2
3	PROJ-EE-721	Minor Project	VII	3
4	PROJ-EE-731	Industrial Training-II	VII	1
5	PROJ-EE-821	Major Project	VIII	9
			Total Credits:	**16**

Total Credits=175*

Note

***subjected to the condition if all the open electives chosen by the student are of 3 credits.**

Semester I

Course Title: Mathematics-I **Max. Marks: 100**
Course Code: BSC-EE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course is designed to impart elementary knowledge of theory of calculus, linear algebra and sequence & series to engineering students that will serve them to solve various engineering problems.

Detailed Contents:

Unit-I

Differential Calculus: Rolle's Theorem, Mean value theorems, indeterminate forms and L'Hospital's rule; Successive differentiation and Leibnitz's theorem, Taylor's and Maclaurin's series of function of single variable, Expansion of functions of single variable.

Unit-II

Multivariable Calculus (Differentiation): Limit, continuity and partial derivatives, physical significance of partial derivative, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

Unit-III

Integral Calculus: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV

Sequences and series: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-V

Matrices: Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Course Outcome:

Upon the successful completion of the course, the student will be able to:

CO1. Understand the significance of Rolle's Theorem, Mean Value theorem, Taylor's and Maclaurin's series for differentiable functions.

CO2. Identify the extrema of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.

CO3. Use basic the integral rules to evaluate both definite and indefinite integrals and apply the same to find areas and volume of revolutions. Apart from these, they have a basic understanding of Beta and Gamma functions.

CO4. Apply the tools of power series and Fourier series to deal with functions of several variables that are essentials in most branches of engineering.

CO5. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

Text Books/References:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics, Jones & Bartlett.
3. **Jain &Iyengar**, Advanced Engineering Mathematics, Narosa Publishers.
4. **N. Piskunov**, Differential & Integral calculus, Vol-I & II
5. **G.B. Thomas and R.L. Finney**, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
6. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
7. **Veerarajan T.**, Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
8. **Ramana B.V.**, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
9. **D. Poole**, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Basic Electrical Engineering **Max. Marks: 100**
Course Code: ESC-EE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course has been designed to provide basic knowledge to the students about the principles of electric circuit analysis, electromagnetism and transformers.

Detailed Contents:

Unit-I

Review of Electric Circuits: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance. Capacitance), ohm's law, Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage & current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C Circuit Analysis: Power & energy relations, analysis of series parallel DC circuits, Star-Delta transformations (ΔY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Superposition Theorems (D.D Analysis only).

Unit-III

A.C. Circuit Analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-IV

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-V

Basic Electrical Installations: Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcome:

At the end of this course, students will demonstrate the ability

CO1. To understand the concepts and applications of different laws used in the networks and circuits.
CO2. To study and analyze the D.C. Circuit and A.C. Circuit with different theorem.
CO3. To study the concepts related to electromagnetism.
CO4. To understand the principle and working of transformers.
CO5. To study and understand different types of electrical installations.

Text Books/ References:

1. **V. D. Toro**, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
2. **L. S. Bobrow**, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
3. **E. Hughes**, "Electrical and Electronics Technology", Pearson, 2010.

4. **D. P. Kothari and I. J. Nagrath**, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
5. **D. C. Kulshreshtha**, “Basic Electrical Engineering”, McGraw Hill, 2009.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Communication Skills **Max. Marks: 100**
Course Code: HSMC-EE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 2 [2-0-0]

Course Objective: This subject is designed to attain the general proficiency in English for the engineering students.

Detailed Contents:

Unit-I
Vocabulary Building: The concept of Word Formation**,** Root words from foreign languages and their use in English**,** Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.**,** Synonyms, antonyms, and standard abbreviations.

Unit-II
Basic Writing Skills: Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely.

Unit-III
Identifying Common Errors in writing: Subject-verb agreement, Noun-pronoun agreement, Articles, Prepositions, Redundancies and Clichés

Unit-IV
Speaking skills: Interviews-Meaning, types of Interview, notices, Agenda, Minutes of meeting, writing introduction and conclusion.

Unit-V
Writing Practices: Comprehension**,** Précis Writing**,** Essay Writing

Course Outcome:
Upon the completion of the course, the students will be able:
CO1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
CO2. To make the students authoritative in self-expression in their day to day life in this fast-changing world.
CO3. To identify the common errors involved in writing.
CO4. To understand the nature and style of sensible writing.
CO5. To write effective and coherent paragraphs.

Text Books/References:

1. **Michael Swan,** Practical English Usage. OUP. 1995.
2. Remedial English Grammar. **F.T. Wood. Macmillan**.2007
3. On Writing **Well. William Zinsser**. Harper Resource Book. 2001
4. Study Writing**. Liz Hamp-Lyons and Ben Heasly**. Cambridge University Press, 2006.
5. **Communication Skills**. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. **Exercises in Spoken English**. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Engineering Mechanics **Max. Marks: 100**
Course Code: ESC-EE-122 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Course Objective: This course has been designed to make the students acquainted about forces and its effects, kinematics and statics.

Detailed Contents:

Unit-I

Two Dimensional force System: Basic Concepts, principal of transmissibility, resultant of a force System, Free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, Varrigon theorem, friction, law of friction, equilibrium of body lying on horizontal and inclined plane, Static and Dynamic Friction, wedge friction, Ladder friction applications.

Unit -II

Centroid and Centre of gravity: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration composite ideas. Mass moment inertia of circular plate, Cylinder, Sphere.

Unit -III

Member forces in Trusses: Planer truss structure, trust joint identification, strategy for planer truss analysis, Statistical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of sections).

Unit -IV

Kinematics of Particles: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies rotation, absolute motion, relative motion. Newton's 2nd law (rectangular, path, and polar coordinates).Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

Unit -V

Virtual Work and Energy Method: Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency. Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

Course Outcome:

Upon successful completion of the course, student should be able to:

CO1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures

CO2. Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts);

CO3. Understand basic dynamics concepts – force, momentum, work and energy;

CO4. Understand and be able to apply Newton's laws of motion;

CO5. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy;

Text Books/References:

1. **Bansal R.K.** (2010), A Text Book of Engineering Mechanics, Laxmi Publications
2. **Khurmi R.S.** (2010), Engineering Mechanics, S. Chand & Co.
3. **Irving H. Shames** (2006), Engineering Mechanics, 4th Edition, Prentice Hall
4. **F. P. Beer and E. R. Johnston** (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill
5. **R. C. Hibbler** (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
6. **Andy Ruina and RudraPratap** (2011), Introduction to Statics and Dynamics, Oxford University Press
7. **Shanes and Rao** (2006), Engineering Mechanics, Pearson Education,
8. **Hibler and Gupta** (2010), Engineering Mechanics (Statics, Dynamics) by Pearson Education
9. **Reddy Vijaykumar K. and K. Suresh Kumar** (2010), Singer's Engineering Mechanics

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Computer Fundamentals **Max. Marks: 100**
Course Code: ESC-EE-123 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This course is provided aiming to achieve a basic knowledge of computer and its programming among engineering students.

Unit-I

Introduction: History and Generations of Computers, Classification and Applications of Computers. Computer Hardware: Components of a computer system, Input and Output devices, Memory Hierarchy, Primary and Secondary memory. Computer Software, System and Application Software, Utility Programs.

Unit-II

Operating systems, Functions and types of O/S, DOS commands, BIOS, POST, Booting Process, Computer Virus, Types of Viruses, Use of Antivirus software.

Computer Languages (Machine, Assembly and High level languages), Translators (Assembler, Compiler and Interpreter). Introduction to algorithm and Flow chart:

Unit-III

Number System: Data Representation, Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Networking: Introduction to networking, Applications, types of computer networks, Network Topology, LAN, MAN, WAN. Networking devices: Hub, switch, router, repeater, and gateway. History of Internet, Internet, extranet and intranet, WWW, E-mail, ISPs, surfing, phishing.

Unit-V

Introduction to HTML: Introduction to HTML. Working of HTML, Creating and loading HTML page, tags, Structure of HTML, Document, Stand Alone Tags, Formatting text, Adding Images, Creating hyper Links, Tables, Sending E-mails through Web Page, Sample web pages.

Course Outcomes:

1. Know the basic components of the computer and working of each device.
2. Understand the functions of Operating System, softwares and DoS Commands.
3. Understand the representation of data in computer.
4. Know the fundamentals of Computer Networking.
5. Know the basics of HTML.

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Course Title: Indian Constitution **Max. Marks: 100**
Course Code: MC-EE-121 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 0[2-0-0]

Course Objective: The basic purpose of this subject is to make a general awareness about our constitution.

Detailed Contents:

Unit I

Constitutional Framework : Historical Background, Making of the constitution, Salient features of the Indian Constitution, Preamble to the Constitution, Union and its territory, Citizenship, Fundamental rights, Directive principles of state policy, Fundamental duties, Amendment of the constitution, Basic structure of the constitution.

Unit II

System of Government: Parliamentary system, Federal System, Centre-state relations, Inter-state relations, Emergency provisions

Unit III

Central government: President, Vice-President, Prime Minister, Central Council of Ministers, Cabinet committees, Parliament, Parliamentary committees, Parliamentary forums, Supreme Court
State Government: Governor, Chief Minister, State Council of Ministers, State legislature, High court, Subordinate Courts, Special status of Jammu and Kashmir, Special provision for some states
Local Government: Panchayati raj, Municipalities.

Unit IV

Constitutional Bodies: Election commission, Union Public service commission, State Public service Commission, Finance Commission, National Commission for SC's, National Commission for ST's, Special officer for Linguistic minorities, Comptroller and auditor general of India, Attorney General of India, Advocate General of India.

Unit V

Non-Constitutional Bodies: Planning Commission, National Development Council, National Human Rights Commission, State Human Rights Commission, Central Information Commission, State Information Commission, Central vigilance Commission, Central Bureau of Investigation, Lokpal and Lokayuktas
Other Constitutional Dimensions: Co-operative societies, Official Language, Public services, Tribunals, Rights and Liabilities of the Government, Authoritative text of the Constitution in Hindi Language, Special Provision relating to certain classes.

Course Outcome:

Upon the completion of this, the students will able to know:

CO1. About the constitutional framework.
CO2. About the government system
CO3. Various type of government
CO4. About Constitutional bodies: Election commission, UPSC, SPSC, Commission for ST/SC and many others.
CO5. Non-constitutional bodies: Planning Commission, NDC, NHRC, SHRC, CBI, Vigilance Commission and other dimensions of constitution.

Text Books/ References:

1. Indian Constitutional Law, M.P. Jain, 7th Edition.
2. Introduction to the Constitution of India, B. K. Sharma, PHI.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Basic Electrical Engineering Lab. **Max. Marks: 50**
Course Code: ESC-EE-131 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The lab has been designed to provide and implement basic knowledge about the principles of electric circuit analysis, electromagnetism and transformers to the students.

List of experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin's Theorem & Norton's Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Laboratory Outcome:

CO1. To study and analyze different circuit elements.
CO2. To study and implements different laws and theorems of electrical circuits.
CO3. To make the students aware about the principles and applications of basic electrical laws.
CO4. To measure the power using two wattmeter method.
CO5. To study and analyze the phenomenon of Resonance in Series and Parallel circuits.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Communication Skills Lab. **Max. Marks: 50**
Course Code: HSMC-EE-131 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

List of Laboratory Sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Laboratory Outcome:

Upon the completion of the lab, the students will be able to:

CO1. Developing intellectual, personal and professional abilities.

CO2. On completion of the course, the students will be accurate in communication.

CO3. The students will be able to communicate effectively on complex engineering activities with the engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Engineering Mechanics Lab. **Max. Marks: 50**
Course Code: ESC-EE-132 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of the Engineering mechanics Lab is to perform experiments which are related to Statics and Dynamics Loading in order to understand the behaviour of different mechanical equipment's which students study in theory.

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwell hardness testing machine.
5. To very Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Laboratory Outcome:

After the completion of lab course students will be-

CO1. Able to understand different engineering mechanics apparatus.
CO2. Able to understand the mechanical properties of materials.
CO3. Able to understand the moment of inertia of various shapes.
CO4. Get the practical idea of frictional forces.
CO5. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Computer Fundamentals Lab. **Max. Marks: 50**
Course Code: ESC-EE-133 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. Objective: The lab has been designed to provide and implement basic knowledge about the computer fundamentals to the students.

List of Experiments:

1. Experiments on dismantling of PC.
    a. Dismantling the system unit, recognize all major components inside a PC, describe function of each component and define the relationship of internal components.
2. Perform these DOS commands
    a. Internal commands.
    DIR, TYPE, DEL, ERASE, MD, CD, COPY, RMDIR, VER, DATE, TIME, PATH, CLS, RMDIR, VER, DATE, TIME, PATH, CLS, BREAK, SET, EXIT.
    b. External commands.
    APPEND, CHKDISK, ATTRIB, SYS, EDIT.
3. Experiments on system utilities
    a. Explore and describe some system utility like regedit, memory partioning, control panel, window tools.
4. MS-Word: Introduction, Starting MS-Word, MS-Word Screen and its Components, Elementary Working with MS-Word.
5. MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.
6. Create a spreadsheet of students, which contains marks obtained by students of a class in different subjects and then calculate maximum, minimum, average and sum of marks in each subject. Also calculate % of each student using functions and formulas in MS-Excel also draw pie chart and bar graph also.
7. MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and Its Components, Elementary Working with MS-PowerPoint.
8. Make a simple presentation on your college, use 3D effects, animation on network topologies.
9. Create HTML pages for your business website.
10. Create HTML pages showing timetable of trains departing from Jammu-Tawi railway station.
11. Create web pages for your college.

Lab Outcomes: Upon the completion of course, the students will be able to:

1. Working on various Operating Systems and their usage
2. Understand and use MS-Office to create documents
3. Understand the basic DoS Commands
4. Recognize Hardware components and their assembly
5. Install Operating system on Hardware and working on HTML

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Workshop Practice **Max. Marks: 50**
Course Code: ESC-EE-134 **University Exam: 0**
Duration of Exam: 2 Hours **Internal Assessment: 50**
Credits: 1 [0-0-2]

Laboratory Objective: In this course the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials. It includes

1. Machine shop
2. Fitting shop
3. Carpentry
4. Welding shop
5. Smithy

Detailed Contents:

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods
2. Fitting operations & power tools
3. Electrical & Electronics
4. Carpentry
5. Plastic moulding, glass cutting
6. Metal casting
7. Welding (arc welding & gas welding), brazing

Laboratory Outcome:

CO1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands.

CO2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

CO3. By assembling different components, they will be able to produce small devices of their interest.

Text Books/References:

1. **Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., —**Elements of Workshop Technology‖, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. **Kalpakjian S. And Steven S. Schmid**, **—**Manufacturing Engineering and Technology‖,
3. 4th edition, Pearson Education India Edition, 2002.
4. **Gowri P. Hariharan and A. Suresh Babu**, Manufacturing Technology – I‖ Pearson Education, 2008.
5. **Roy A. Lindberg**, **—**Processes and Materials of Manufacture‖, 4th edition, Prentice Hall India, 1998.
6. **Rao P.N**., **—**Manufacturing Technology‖, Vol. I and Vol. II, Tata McGraw Hill House.

Note: Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Course Title: Induction Program **Max. Marks: 0**
Course Code: MC-EE-131 **University Exam: 0**
Duration of Exam: 0 Hours **Internal Assessment: 0**
Credits: 0 [0-0-0]

Induction program

Induction program for students to be offered right at the start of the first year. It should include but not limited to following Activities

1. Physical activity
2. Creative Arts
3. Universal Human Values
4. Literary
5. Proficiency Modules
6. Lectures by Eminent People
7. Visits to local Areas
8. Familiarization to Dept./Branch & Innovations

Semester II

Course Title: Mathematics-II **Max. Marks: 100**
Course Code: BSC-EE-221 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This course is designed to impart advanced knowledge of multivariable integration, theory of differential equations and complex variable to engineering students that will serve them to solve real life engineering problems.

Detailed Contents:

Unit-I

Multivariable Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes' (without proofs).

Unit- II

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Second order linear differential equations with variable coefficients, method of variation of parameters.

Unit- III

Partial Differential Equations: Partial differential equations and its formation, Linear and non-linear partial differential equations of first order and their solutions, Charpit's method, Lagrange's method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions, Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables.

Unit- IV

Complex Variable – Differentiation: Differentiation, Cauchy-Riemann equations, analytic functions, elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit- V

Complex Variable – Integration: Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem (without proof) and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

Course Outcome:
Upon the completion of this course, the students will be able to:

CO1. Compute double and triple integrals over rectangular and spherical domains and memorize important theorems: Green, Gauss divergence and Stokes with their applications in various engineering problems.

CO2. Distinguish between linear and non-linear equations. Recognize and solve equations of Bernoulli, Euler and Clairaut.

CO3. Solve partial differential equations of various kinds and apply the same to solve problems of real world.

CO4. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.

CO5. Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.

Text Books/References:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **D. Zill,** Advanced Engineering Mathematics, Jones & Bartlett.
3. **Jain &Iyengar**, Advanced Engineering Mathematics, Narosa Publishers
4. **N. Piskunov**, Differential & Integral calculus, Vol-I & II
5. **G. B. Thomas and R.L. Finney**, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
6. **S. L. Ross**, Differential Equations, 3rd Ed., Wiley India, 1984.
7. **E. A. Coddington**, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
8. **E. L. Ince**, Ordinary Differential Equations, Dover Publications, 1958.
9. **J. W. Brown and R. V. Churchill**, Complex Variables and Applications, 7th Ed., Mc- Graw Hill, 2004.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Basic Electronics Engineering **Max. Marks: 100**
Course Code: ESC-EE-221 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4[3-1-0]

Course Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semiconductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semiconductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, use of transistor as a switch.

Unit-IV

Biasing Techniques and biasing stability (BJT):- Need for biasing, operating point, load line analysis, bias stability. fixed bias configuration, emitter bias configuration, voltage divide bias configuration, analysis of these biasing techniques.

Unit-V

Field Effect Transistors: Operation and characteristics of JFET and MOSFET, types of MOSFET, Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Colpitts and Phase Shift oscillators (transistor version only and no derivation).

Course outcomes:

At the end of the course, the student will be able to:

- **CO1.** Describe the energy bands and the scientific principles behind conductivity in semiconductors.
- **CO2.** Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
- **CO3.** Analyze the working of various traditional transistors such as BJT and FET along with the recently used MOSFET based transistors as well as the concept of biasing in these transistors.
- **CO4.** Understand various feedback systems and oscillators.
- **CO5.** Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.

2. **Sedra & Smith,** Microelectronic Circuits, Oxford Printing Press.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Engineering Physics **Max. Marks: 100**
Course Code: BSC-EE-222 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective:

1. To understand the importance of applications of Applied Physics in daily life
2. To provide the students with a basic understanding of Physics that may be required by engineers in the course of their careers
3. To acquaint students with the fundamentals of vibrations, acoustics and ultrasonic and how they help in mankind by using engineering skills.
4. To enhance knowledge related to principle working of Lasers and its different components to make it suitable for various purposes
5. To introduce the learners to the basics of Quantum Mechanics

Detailed Contents:

Unit-I

Waves, Oscillations and Introduction to Acoustics: Wave motion, its types, Equations of wave motion, Energy and Intensity of a progressive wave, Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves, their detections and applications. A brief introduction to the acoustics of a hall, factors affecting the acoustics of the buildings, Reverberation Period, Sabine's Formula for calculating Reverberation Time.

Unit-II

Electrostatics in a linear dielectric medium & Magnetostatics: Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; solving simple electrostatics problems in presence of dielectrics – Point charge at the Centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. Magnetostatics: Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Unit -III

Quantum Mechanics for Engineers: Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets.

Unit-IV

Applying the Schrodinger equation: Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator.

Unit-V

Optics: Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings. Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, absent spectra. Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its

principle, He-Ne laser.

Course Outcomes:

After completing of the course, the students will:

CO1. Understand the importance of Applied Physics in describing the technology we are using today in different engineering fields

CO2. Acquired knowledge of Waves, Vibration and acoustics, helps the students to develop the acoustically good hall.

CO3. Knowledge of basic Quantum Mechanics can help the students for further research applications as they can be applied to any quantum, mechanical situation to find energy, momentum etc.

CO4. Acquired knowledge of Optics help the students to

a) Know more about propagation of light and wave optics.
b) Describe the requirements for a system to act as a laser.
c) Differentiate the various types of lasers and their means of excitation.
d) Able to explain, which laser would best meet the need for a industrial or research task.
e) Demonstrate an awareness of the safety responsibilities involved in working with lasers.

Text Books/ References:

1. **Pathania K. S. &Khera S. K.,** Waves and Vibration,
2. **Beiser**, **Arthur**, Concepts of Modern physics, TMH.
3. **Rangwala** and **Mahajan**, "Electricity and Magnetism", Tata McGraw Hill, 1998
4. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves,
5. **David J. & Cheek**, Fundamentals and application of ultrasonic waves,
6. **Avadhanulu M. N. &Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
7. **Vijaya K. K., Chandralingam S.,** Modern Physics, S. Chand & Co. Ltd, New Delhi
8. **Mani and Mehta**, G.K. "Modern Physics", Affiliated East-West Press Pvt. Ltd., 1998.
9. **Arora C.L**, Refresher Course in Physics, S. Chand & Company Ltd.
10. **Grifiths David J.,** Introduction to Quantum Mechanics, 2nd Edition 2016, Cambridge University Press
11. **Sharma K. K.**, Optics: Principles and Applications 2017, Elsevier
12. **Shankar R.**, Principles of Quantum Mechanics 2011, Springer
13. **Jenkins & White H E**, Fundamentals of Optics 4 edition 2017, McGraw Hill Education

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Engineering Chemistry **Max. Marks: 100**
Course Code: BSC-EE-223 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course is designed to familiarizing the students of engineering with Water treatment, polymerization, photochemistry, corrosion and transition metal chemistry.

Detailed Contents:

Unit-I

Water Treatment: Water quality measurement, Hardness of water, Estimation of hardness of water ,Disadvantages of hard water ,Scale and sludge formation; disadvantages, prevention and treatment, Desalination method, reverse osmosis ,Electro dialysis, Domestic water treatment.

Unit-II

Polymerization

Basic concept of polymerization, Broad classification and industrial applications (Buna-N, Buna-S, Polyester, Polyethene, Polypropene, Polystyrene,), Thermosetting plastic and its softening, Biodegradable and non-biodegradable wastes.

Unit- III

Photochemistry: Photo excitation, Luminescence and types, Norrish-I and Norrish-II reactions, Application examples of photolysis, Photosynthesis Z –Diagram, Chemistry of vision, MRI equipment and procedure of working.

Unit-IV

Transition Metal Chemistry: Structure of organic compounds up to coordination no 6, Isomerism (geometrical, optical, ionization, linkage and coordination isomerism, bonding in coordination compounds by CFT, VBT. Application of coordination compounds in organic synthesis and Medical fields.

Unit-V

Cement and Lime: Introduction and types of cement, Manufacture of Portland cement, Setting and hardening of cement, Introduction and properties of Lime, Setting and hardening of lime.

Course Outcome:

At the end of course, the student will be able to

CO1. Apply the methods to produce soft water for industrial use and potable water at cheaper cost.

CO2. Substitute metals with conducting polymers and also produce cheaper bio-degradable polymers to reduce environmental pollution,

CO3. Apply knowledge about photochemical and photo physical processes and the reactivity of excited states to explain applications in photochemical energy conversion.

CO4. Understand structure of organic compounds and transition metal compound synthesis,

CO5. Understand the manufacturing process of cement and lime.

Text Books/References:

1. **Odion G.G**-Principles of Polymerisation, John Wiley and sons.
2. **S.S Dara**-A Text Book of Engg. Chemistry.

3. **B.Sivasankar**-Engineering Chemistry, Tata McGraw Hill Publication.
4. **S.Chand**-Practical Manual for Engineering Chemistry.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: C-Programming **Max. Marks: 100**
Course Code: ESC-EE-222 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This course is provided aiming to enhance the logical skills of engineering students with the basic programming concepts and implementation in C Programming.

Unit-I

Introduction to C Programming: Overview of programming languages, algorithms and flowcharts, History of C, Structure of a C Program, Compiling & Executing a C program. Constants, Variables and Data Types, Storage classes, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Looping: while statement, do-while statement, for statement.

Unit-III

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, strings, basic string operations**.**

User defined data types: Structure, Defining structures, Array of Structures, Introduction to Union and enumerated data types.

Unit-IV

Functions: Introduction to Function, Types of functions, function declaration, calling a function, passing arguments to functions, passing arrays to functions, Recursion.

Unit-V

Introduction to Pointers & Files: Operations on pointer, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Introduction to File, Operations on files: open, close, read and write.

Course Outcomes: The student will be able:

1 To translate the algorithms and flowcharts to programs (in C language) for execution.
2 To make the usage of various control statements for developing an efficient program to solve the problems.
3 To decompose a complex problem into functions for solving it efficiently.
4 To use the arrays and user defined data types for synthesizing a complete program.
5 To use pointers, files and dynamic memory allocations to perform several operations in programs.

Text Books

1. **Yashavant P. Kanetkar ,** Let Us C, BPB Publication, 15th Edition.
2. **Gottfried**, Programming with C, TMH.

Reference Books

1. **E. Balaguruswamy**, Programming in ANSI C, Tata McGraw-Hill.
2. **Venugopal**, C Programming, TMH.
3. **Yashwant Kanitkar**, Pointers in C, TMH.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each Unit .The student has to attempt five questions at least one from each Unit.

Course Title: Environmental Science **Max. Marks: 100**
Course Code: MC-EE-221 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 0 [2-0-0]

Course Objective: This course is designed to make the engineering students to understand the significance of environment and ecology in human survival and growth. It also aims to connect the budding engineers to nature.

Detailed Contents:

Unit-I

Elements of Ecology: Definition, Scope and basic principles of ecology and environment. Biological levels of organization, population, community, ecosystem and biosphere. Climatic factors - Solar radiations, temperature, water and precipitation.

Unit-II

Environmental pollution: Types of pollution, Air pollution, Noise pollution, Water pollution, Soil pollution, Thermal pollution, Radiation pollution

Unit-III

Biogeochemical Cycles: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Global Oxygen Cycles. Hydrological cycles.

Unit-IV

Succession: Concepts of succession, Types of Succession, Trends in succession, Climax and stability, Co-evolution and group selection.

Unit-V

Major biomes of the world, Characteristics of terrestrial fresh water and marine ecosystems; Forests, grasslands, lake, river and marine ecosystems of India.

Course Outcome:

Upon the completion of the course, students will able to:

CO1. Learn about the environment and ecology.
CO2. Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
CO3. Understand biogeochemical cycles and human contribution in it.
CO4. Learn succession and various types of succession.
CO5. Demonstrate the ability to understand the biomes of world and its importance in human survival.

Text Books/References:

1. **J.S.Singh, S.P. Singh and S.R. Gupta.** 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).
2. **S.C. Santra.** 2011. Environmental Science. New Central Book Agency.
3. **M.H. Rao and H.V.H. Rao.** 1998. Air Pollution. Tata McGraw Hill Publication.
4. **V.P. Kudesia.** 1997. Air Pollution. Pragati Prakashan.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Basic Electronics Lab. **Max. Marks: 50**
Course Code: ESC-EE-231 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Objective: The course is designed to provide experimental foundation for the theoretical concepts and to familiarize students with basic electronic devices, their applications and characteristics.

List of Experiments:

1. To plot the Resonance curve for a series & parallel resonance.
2. To determine and plot operating characteristics of a PN junction diode
3. To study the input / output waveforms of Half wave and bridge wave rectifiers
4. To suppress the ripple in rectifiers using RC filters.
5. To study the clipper and clamper circuits.
6. To study the Zener characteristics and its application as voltage regulator
7. To plot characteristics of transistor in CE/CB configuration
8. To plot characteristics of a BJT.
9. To plot MOSFET characteristics.
10. To study frequency response of RC Coupled Oscillators.

Laboratory Outcomes:

- **CO1.** Determine the characteristics of PN Junction and Zener diode.
- **CO2.** Design various rectifiers configuration and evaluate its various performance parameters.
- **CO3.** Design and analyze various wave shaping circuits.
- **CO4.** Determine the characteristics of a BJT and MOSFET
- **CO5.** Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents. Experimentation to be supported by computer simulations.

Course Title: Engineering Physics Lab. **Max. Marks: 50**
Course Code: BSC-EE-231 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The Laboratory is designed to provide experimental foundation for the theoretical concepts and to familiarize students with experimental apparatus, the scientific method and method of data analysis.

List of Experiments:

1. Measurement of Resistance.
2. Measurement of e/m by helical method/Thomson's method.
3. Determination of Resistivity of a given wire.
4. Determination of Band Gap of a semiconductor.
7. To determine the refractive index of the prism material using spectrometer.
8. To determine Young's modulus of a bar.
9. To determine the wavelength using Fresnel's bi-prism/diffraction grating.
10. To Determine Plank's Constant.
11. Verify the Stefan's law by incandescent lamp
12. To determine the susceptibility of a ferromagnetic material
13. Study of Nano TiO2 solar cell
14. Ultrasound measurement a given liquid

15 Joule's constant experiment

16. Determination of unknown capacitance of a capacitor by de-Sauty bridge method.
17. Refractive index of a glass slab/ water by travelling microscope
18. To determine the frequency of an ac supply by using electrical vibrator
19. To find the inner and outer diameter of a hollow cylinder by using Vernier caliper.
20. To determine the diameter of a thin wire by using screw gauge and its area of cross-section.
21. Measurement of 'g' and Time period by using compound pendulum.
22. To find the viscosity of a liquid using stoke's method.

Laboratory Outcome:

On Completion of this course, students are able to –

CO1. Develop skills to impart practical knowledge in real time solution.

CO2. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.

CO3. Design new instruments with practical knowledge.

CO4. Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.

CO5. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Engineering Chemistry Lab. **Max. Marks: 50**
Course Code: BSC-EE-232 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The course is designed to provide experimental foundation for the scientific method for analysis, synthesis and determination of various chemicals

List of Experiments:

1. Acid Base Titrations.
2. Viscosity of Solutions, Determination of composition of sugar solutions from Viscosity.
3. Synthesis of Aspirin.
4. Determination of Functional Groups in Organic Compounds.
5. Synthesis pf p-Nitro Aniline from Acetanilide.
6. Conduct metric Titrations.
7. Determination of Proteins in given sample of Food.
8. Determination of Flash and Fire Point of a Lubricant.

Laboratory Outcome:
At the end of practical course the students will be familiarized about
CO1. Titrations,
CO2. Synthesis of organic compounds,
CO3. protein determination and viscosity of solutions and
CO4. temperature dependent properties of lubricant.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: C-Programming Lab. **Max. Marks: 50**
Course Code: ESC-EE-232 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Lab. Objectives: The course is designed to provide practical foundation for computer programming and to familiarize students with error handlings in programming.

List of Experiments:

1. Familiarization with programming environment.
2. Basic programs in Sequential Statement in C
3. Simple computational problems using arithmetic expressions.
4. Problems involving if-then-else structures.
5. Iterative/looping problems e.g., sum of series.
6. Performing operations on 1D Array.
7. Performing operations on 2D Array.
8. Performing operations on String.
9. Programs on Function declaration, definition and calling.
10. Implementation of Mathematical function
11. Programming for solving Numerical methods problems.
12. Programs on Recursive functions.
13. Programs on Pointers and structures.
14. Programs on File operations.

Lab. Outcomes

1. To be able to correct syntax and logical errors as reported by the compilers and run time for basic programs.
2. To be able to write iterative as well as recursive programs using functions as well
3. To be able to represent data in arrays, strings and structures and manipulate through a program
4. To be able to declare pointers of different types and use them in defining self-referential structures.
5. To be able to create, read and write to and from simple text files.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Engineering Graphics Lab **Max. Marks: 100**
Course Code: ESC-EE-233 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [1-0-4]

Laboratory Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Detailed Contents:

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses. Projections: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of Straight line and their Traces: Projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of Surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Sectional orthographic views of geometrical solids, Purpose of development, Development of prism, cylinder, cone and pyramid surface

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non-symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Isometric Views of lines, Planes, Simple and compound Solids; Difference between isometric projection and Isometric view, Isometric projection of solids such as cube, prism, pyramid and cylinder. Introduction to computer aided drafting (CAD)

Laboratory Outcome:

On completion of course students must be able

CO1. To read Engineering Drawing and execute the construction work with the help of available drawing
CO2. To represent three dimensional objects by two dimensional views.
CO3. Students must be in a position to show hidden details of objects or underground constructions work by drawing sectional views.
CO4. Exposure to creating working drawings
CO5. Exposure to the visual aspects of engineering design.

Text Books/ References:

1. **Bhat, N. D. and Panchal, V. M**., Engineering Drawing, Charotar Publishers, Anand.
2. **Narayana, K. L. and Kannaiah, P**.,Engineering Graphics, Tata McGraw Hill, New Delhi.

3. **Gill P. S.**, Engineering Graphics and Drafting, Katria and Sons, Delhi.
4. **Luzzadde Warren J.,** Fundamentals of Engineering Drawing, PHI.
5. **Shah, M.B. &Rana B.C.** (2008), Engineering Drawing and Computer Graphics,Pearson Education

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Semester III

Course Title: Mathematics-III **Max. Marks: 100**
Course Code: BSC-EE–321 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The objective of this course is to familiarize the students with various transform. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

Detailed contents

Unit-I

Integral Transform-I: Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of Unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integro-differential equations.

Unit-II

Integral Transform-II: Fourier integral, Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

Unit-III

Z-Transform: Introduction and definition of z-transform, some standard forms, Linearity property, Damping rule Some standard results, shifting un to the right and to the left, Multiplication by n. Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

Unit-IV

Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables,

Unit-V

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares-fitting of straight lines, second degree parabolas.

Course Outcomes:

After the completion of this course, the students will be able to:

CO1. Understand the basic concepts and techniques to solve Laplace transform and also learn to apply the same to solve various problems of engineering which are modelled through differential equations

CO2. Demonstrate the ability to understand the basic concepts and techniques to solve Fourier's transform and also learn to apply the same to find solutions of boundary value problems (BVP).

CO3. Apply the concepts of the z-transform in solving difference equations and other discreet signal system.

CO4. Learn the ideas of probability and random variables and various discrete and continuous probability distributions and their properties.

CO5. Understand the basic ideas of statistics including measures of central tendency, correlation and regression and apply various statistical methods in engineering problems.

Text Books/References:

1. **Erwin kreyszig**, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. **Ross, A:** First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. **Ramana B.V.,** Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010
4. **Veerarajan T.,** Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2010.
5. **W. Feller,**An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
6. **David A. Santos,** Probability: An Introduction, Jones &Bratlett

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Use of calculator is allowed in the examination.

Course Title: Electro Fields and Waves **Max. Marks: 100**
Course Code: PCC-EE–321 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to understand the student with different aspect of electrical and magnetic Field.

Detailed contents

Objective: The course has been designed to acquaint the students with basic concepts of Electromagnetic theory.

Unit-I

Vector Calculus: Review of vector analysis, Scalar & vector products, gradient, divergence and curl of a vector, Rectangular, Cylindrical and Spherical co-ordinate system, Transformation amongst rectangular, cylindrical and spherical co-ordinate system.

Unit-II

Electrostatics: Coulomb's law, application of coulombs law, electric field intensity from point charges, field due to continuous distribution of charges, gauss's law, application of gauss's law, Electric displacement and displacement density potential function, potential field of a point charge, Laplace's and Poison's equations, Divergence Theorem.

Unit-III

Magnetostatics: Magnetic field intensity and magneto motive force, Ampere's Circuital law, applications of ampere's circuital law, Biot-savart law and its application, vector potential, magnetic dipole. Ampere's work law in differential vector form, continuity of currents, conduction and displacement current, Strokes Theorem.

Unit-IV

Time Varying Fields: Faradays law, Maxwell's equations (Differential, Integral and Phasor forms). Uniform plane waves. Representation of wave motion in free space, perfect dielectrics and Lossy dielectrics (Wave equations). Pointing Theorem and Power density. Propagation in good conductor and Skin effect. Reflection of Uniform plane waves.

Unit-V

Introduction To Transmission Line and Wave Guides: Introduction, Circuit representation of parallel plane transmission lines, Transmission lines with losses, Characteristic impedance, Characteristic impedance at radio frequencies, Propagation constant, Attenuation constant and phase constant, Waves between parallel plane, Transverse Electric wave, Transverse magnetic waves; characteristics of TE & TM waves; velocity of propagation; Attenuation in parallel plane guides; wave impedance.

Course Outcomes:

At the end of the course, students will demonstrate the ability.

CO1. Apply vector calculus to static electric-magnetic fields in different engineering situations.

CO2. Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.

CO3. Examine the phenomena of wave propagation in different media and its interfaces.

CO4. Analyze the nature of electromagnetic wave propagation in guided medium.

Text / References:

1. **M. N. O. Sadiku**, "Elements of Electromagnetics", Oxford University Publication, 2014.
2. **A. Pramanik**, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009.
3. **A. Pramanik**, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
4. **G. W. Carter**, "The electromagnetic field in its engineering aspects", Longmans, 1954.
5. **W. J. Duffin**, "Electricity and Magnetism", McGraw Hill Publication, 1980.
6. **W. J. Duffin**, "Advanced Electricity and Magnetism", McGraw Hill, 1968.
7. **E. G. Cullwick**, "The Fundamentals of Electromagnetism", Cambridge University Press, 1966.
8. **B. D. Popovic**, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers, International Edition, 1971.
9. **W. Hayt**, "Engineering Electromagnetics", McGraw Hill Education, 2012.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Course Title: Network Analysis & Synthesis **Max. Marks: 100**
Course Code: PCC-EE-322 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of electrical networks and their synthesis.

Detailed contents

Unit-I

Network Theorems & Network Topology: Network Theorems Superposition, Reciprocity and Millman's, theorems, Thevenin's and Norton's theorems; Maximum Power transfer theorem (A.C Analysis only). Network Topology: Graph of a network, Concept of tree and co-tree, incidence matrix, tie-set, and cut-set schedules, Formulation of equilibrium equations in matrix form, Solution of resistive networks, Principle of duality.

Unit-II

Capacitive, Inductive Transients & First Order Circuits: Capacitive Transients, Inductive Transients, Combination of Capacitance & Inductance, Initial and Final Conditions, Exponential Functions, Timing Intervals of First and 2^{nd} Order Circuits. Laplace Transform application to solve differential equations and analysis of electric circuits.

Unit-III

Two Port Networks Parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port network in different parameters. Interconnection of two port networks. Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.

Unit-IV

Network Synthesis: Transfer Functions, Natural and Forced Responses, Poles and Zeros of Transfer Functions, Foster and Caure's Forms, Stability, Hurwitz's Polynomials.

Unit-V

Filter Synthesis: Introduction, Classifications of filters, Characteristic Impedance and propagation constant of pure reactive Networks, Ladder Network, T–Section, Pie Section, Terminating Half Section, Pass Bands and Stop Bands, Design of constant K, n – Derived Filters, Composite Filters.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

CO1. Apply network theorems for the analysis of electrical circuits.
CO2. Provide solution for First and second order networks and obtain the transient and steady-state response of electrical circuits.
CO3. Analyze two-port circuit behavior.
CO4. To synthesize various networks using different synthesis techniques.
CO5. To understand and synthesize different types of filters.

Text / References:

1. **M. E. Van Valkenburg**, "Network Analysis", Prentice Hall, 2006.
2. **D. Roy Choudhury**, "Networks and Systems", New Age International Publications, 1998.

3. **W. H. Hayt and J. E. Kemmerly**, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
4. **C. K. Alexander and M. N. O. Sadiku**, "Electric Circuits", McGraw Hill Education, 2004.
5. **K. V. V. Murthy and M. S. Kamath**, "Basic Circuit Analysis", Jaico Publishers, 1999.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Digital Electronics **Max Marks: 100**

Course Code: PCC-EE-323 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Detailed Contents:

Unit-I

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Boolean algebra, Boolean Theorems, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Simplification techniques and Minimization methods: K-MAPS, Q-M (Tabulation) method.

Unit-II

Combinational Logic Circuits: Design and Analysis of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, Subtractors, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers, seven segment display.

Unit-III

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF), Edge-Triggered Flip- Flops, characteristic tables and excitation tables, conversion of flip-flops, Design of Flip-Flops using state diagrams and state tables, state reduction and assignment.

Unit-IV

Basic Flip-Flop Applications: Shift registers and Functions, Serial In - Serial Out Shift Registers,Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In -ParallelOut Shift Registers, Bidirectional Shift Registers, Synchronous and Asynchronous Counter Operation, Mod-n Counters, Design of counters.

Unit-V

Basics of Semiconductor Memories: Random-Access Memories (RAM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA, IEEE notations

Introduction to digital logic families: brief background and comparison of various logic families-TTL, ECL, MOS, CMOS.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Examine the structure of various number systems and its application in digital design.
- **CO2.** Understand, analyze and design various combinational and sequential circuits.
- **CO3.** Analyze different types of registers and design counter circuits.
- **CO4.** Analyze different logic families, their characteristics and performances
- **CO5.** Design solutions to real world problems.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Anil K Miani**, Digital Electronics, Wiley publications.

Reference Books:

1. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.
2. **P. Malvino**, Digital principles and applications, Tata McGraw.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will beset from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Electrical Engineering Materials **Max. Marks: 100**
Course Code: PCC-EE-324 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The course has been designed to get student acquainted with the properties of various engineering materials and their applications in Engineering Sciences.

Detailed contents

Unit-I

Crystal Structure of Solids: Atomic packing, crystal lattice, Different type of crystal Bands, structure of silicon & Germanium, Energy Bands in solids, one dimensional lattice, Electron in periodic potential, concept of hole, Three dimensional Lattice and Brullioun Zones Elastic Wave and Photons (Elementary Ideas).

Unit-II

Insulating Materials: Introduction to Insulators, dielectric behavior, Properties of Insulating Materials, Insulators in Static & Alternating fields, classification as per temperature rise, Practical Dielectrics, Liquid: Solid and Gaseous and their applications.

Unit-III

Dielectric Materials: Polarization, Quantitative and qualitative discussion of dielectric constants of polyatomic molecules, Internal fields in solids and Liquids. Ferroelectrics & Piezoelectric Materials, spontaneous polarization, Frequency dependence of polarizabilities, complex dielectric constant of non-dipolar solids, Dipolar relaxation, dielectric losses, Dielectric Break downs.

Unit-IV

Magnetic Materials: Review of magnetic field concepts, Orbital dipole, and angular momentum of simple atomic models, classification of magnetic materials, spontaneous magnetism, Curie- Weiss Law, coercive forces; antiferro magnetic materials, ferromagnetic materials, Properties & applications of ferrites.

Unit-V

Conductivity of Metals: Ohm's Law, Relaxation time, collision time and mean free path, resistivity of conductors, temperature dependence of resistivity, super conductivity.

Semiconductor Materials: classifying materials as semiconductors, chemical bond in Si and Ge & its consequences, density of carriers in intrinsic semiconductors, the energy gap, the conductivity of intrinsic semiconductors, Carrier densities in n-type semiconductors & p-type semi-conductors, Hall Effect and Carrier Density.

Course Outcomes

CO1. Given a type of material, the students will be able to qualitatively describe the bonding scheme and its general physical properties, as well as possible applications in electrical engineering.
CO2. This will be helpful for the students to understand about the insulating properties of the materials.
CO3. This will be helpful for the students to understand about the Dielectric properties of the materials.
CO4. Students will be able to do comparative analysis of magnetic materials based upon their properties.
CO5. Students will be able to differentiate among various materials such as conductor and semiconductor based upon the internal composition and conductivities.

Text Books/References

1. **Dekker**, Electrical Engineering Materials.
2. **Allison**, Materials & Electronics Engineering & Devices.
3. **Raghvan**, Electrical Engineering Materials.
4. **S.P. Seth and P. V. Gupta**, Electrical Engineering Materials.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Open Elective course-I **Max. Marks: 100**
Course Code: OEC-EE-(--) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Open Elective Courses I

Course Title: Data Structures Using C **Max Marks: 100**
Course Code: OEC-EE-321/PCC-CSE-321 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 4[3-1-0]

Course Objectives:
1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea for Hash Function, Separate Chaining, Open Addressing, Linear Probing.
Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

Unit-III

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures.
Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.
Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-IV

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

Unit-V

Graphs: Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms: Dijkstra`s Algorithm and Warshall`s Algorithm, Minimum Spanning Tree, Kruskal`s Algorithm and Prim`s Algorithm.

Course outcomes: At the end of this course, the student will able to do the following:
1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books:

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.

Reference Books:

1. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
2. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Object Oriented Programming Using C++ **Max Marks: 100**
Course Code: OEC-EE-322 / PCC-CSE-322 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 4[3-1-0]

Course Objective: The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, and an appropriate framework for automated unit and integration tests.

Detailed Contents:

Unit-I
Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm, Basic concepts of OOP's, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of procedural and object-oriented programming languages.
Unit-II
Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.
Unit-III
Classes and Objects: Structure and Class, Classes and objects, access specifies in C++, Inline Functions, Friend Functions, Constructors, and Destructors.
Polymorphism: Function Overloading, Operator Overloading, Virtual functions, Type Conversions in C++. Dynamic memory allocation in C++.
Unit-IV
Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi-level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding.
Generic programming with templates: Class templates, Function Templates, overloading template function, templates as member function of a class.
Unit-V
Exception Handling and Files: Exception handling overview, exception handling mechanism, throwing, and catching mechanism, multiple catch, catch all exceptions, rethrowing an exception.
Streams and Files: C++ Streams, Unformatted I/O operations, Formatted Console I/O operations, Opening and closing a file, File Pointers and their Manipulations, Sequential Input and Output Operations, Command Line Arguments.
Course Outcomes: At the end of this course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.
5. Must be able to understand and use Exception handling.

Text Books:

1. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.

2. **Balagurusamy E**, Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. **Bjarne Strustrup**, The C++ programming Language, Addison Wesley.
2. **Booch**, Object Oriented Analysis and Design with Applications, Addison Wesley.
3. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

Course Title: Introduction to Fluid Mechanics **Maximum Marks: 100**
Course Code: OEC-EE-323/PCC-CE-323 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credit 3(2-1-0)

Objective: The objective of this course is to acquaint the students about the characteristics and behavior of static and flowing fluids and to introduce the students to various concept and applications of hydraulics. At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulics.

Detailed Contents:

Unit-I

Physical Properties of Fluids: Mass density, Weight density, Specific gravity; Viscosity-kinematic viscosity, Units, Newtons law of viscosity; Surface tension- expressions for liquid droplet, hollow bubble & liquid jet Capillarity-expressions for rise/fall; Types of Fluid-Ideal, Real, Newtonian & Non-Newtonian fluids; Types of flows-Laminar & turbulent flows, Steady & unsteady, Uniform & non-uniform, Compressible & incompressible flows, Streamlines, Streak lines & Path lines; Continuity equation & its differential form; Velocity potential and Stream functions.

Unit-II

Fluid Statics: Pressure-absolute, gauge, atmospheric & vacuum pressures; Pascal's law and Pressure variation in a static fluid; Manometers-piezometer, U-tube, Single column and differential U-tube manometers; Total pressure & Centre of pressure on plane and curved submerged surfaces; Buoyancy & Archimedes Principle, Meta-Centre-determination of metacentric height by analytical & experimental methods; Stability of submerged and floating bodies.

Unit-III

Dynamics of Fluid Flow: Euler's equation of motion along streamline and Bernoulli's equation; Flow measurement by Venturimeter & Orificemeter; Momentum of fluid- Impulse-momentum equation, Kinetic & Momentum Correction factors and Moment of momentum equation; Vortex Motion-Free and Forced vortex flows.

Unit-IV

Dimensional Analysis and Similitude: Dimensional homogeneity, Dimensional analysis-Rayleigh method and Buckingham's Pi- theorem; Similitude; Dimensionless numbers; Model Laws-Reynolds and Froude Model laws; Model testing of partially submerged bodies; Distorted models and their scale ratios.

Unit-V

Miscellaneous

Flow around submerged bodies: Drag on a flat plate, cylinder and sphere. Circulation & lift on cylinder.
Orifices & Mouthpieces: Flow through large rectangular orifice & external cylindrical mouthpiece.
Notches & Weirs: Discharge over rectangular, triangular and trapezoidal notches/weirs.

Course Outcomes: After the completion of the course the students will be able to

1. Understand type of fluid, behavior of fluid, basic concept and theorem used in fluid Mechanics and apply their knowledge of fluid mechanics in addressing problems in Hydraulics.

2. They will possess the skills to solve problems in laminar flow, Turbulent flow, boundary layer thickness calculation and for better understanding of this all application.
3. They will gain knowledge in Types of models, Application of dimensional analysis and model studies to fluid flow problem.
4. The basic of The Laminar Flow and turbulent flow and concept of boundary layer theory
5. The Dimensional analysis and model studies to the flow problems.

Text Books:

1. **Kumar, D. S.,** Fluid Mechanics. Kataria & Sons Publishers, New Delhi, 1998 Ed.
2. **Streter V. L., Wylie, E.B. & Bedford K. W.,** Fluid Mechanics, MGH, 2001 **Reference**

Books:

3. **P.M. Modi and S.M. Seth**, Hydraulics and Fluid Mechanics, Standard Book House
4. **K. Subramanya** ,Theory and Applications of Fluid Mechanics, , Tata McGraw Hill

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Course Title: Digital Electronics Lab **Max Marks: 50**
Course Code: PCC-EE-331 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments:

1. Study of pin diagram of various ICs and to test the logic gates and verify their truth tables.
2. Implementation of following combinational circuits using Logic Gates.
    a. Half and Full Adder.
    b. Half and Full Subtractor.
3. Implementation of Multiplex, De-multiplexer, Decoder and Encoder.
4. Implementation of Boolean functions using MUX.
5. To add two 4-bit binary numbers using IC 7483.
6. To verify the operation of different modes of shift register using IC 7495.
7. Design of BCD to 7 segment display using logical gates.
8. Implementation of different Flip-Flops.
9. Implementation of Shift registers and Counters using Flip-Flops.
10. Simulations
    a. Introduction to circuit maker and electronic work bench.
    b. Implementation of experiments from Serial No. 1 to 9 through simulations.

Course Outcomes:

After completion of the course student will be able to:

CO1. Test and verify logic gates with its truth.
CO2. Implement basic arithmetic circuits.
CO3. Implement Multiplexer, De-Multiplexer, Encoder & Decoder circuits.
CO4. Use modern engineering and IT tools for circuit simulations.
CO5. Function effectively as a team.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Network Analysis & Synthesis Lab **Max. Marks: 50**
Course Code: PCC-EE-332 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The student will be able to verify different fundamental theorem. Also student will be able to analyze & synthesize network.

List of Experiments:

1. Verification of Thevenin's theorem, Norton's theorem.
2. Verification of Maximum power transfer theorem, Superposition theorem.
3. Verification of Reciprocity theorem.
4. Design and implementation of T and Π passive filters.
5. Determination of h-parameters of a network.
6. Study of sinusoidal steady state response of a network.
7. Study of transient response of a network.
8. Study of passive integrator and differentiator.
9. Syntheses of RC-network for a given network function.
10. Verification of equivalence of star and delta transformation.

Laboratory Outcomes:
The student's will be

CO1. Knowing about various networks.
CO2. Able to analysis various theorems.
CO3. Able to design and implement passive filters.
CO4. Able to evaluate steady and transient state of a network.
CO5. Able to finds many performance indices in the circuit.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Open Elective Course-I Lab **Max. Marks: 50**
Course Code: OEC-EE-333 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Open Elective Courses-I Lab

Course Title: Data Structures Using C Lab **Max Marks: 50**

Course Code: OEC-EE-331/PCC-CSE-331 **University Exam: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Credits: 1[0-0-2]

List of Programs:

1. Program to demonstrate concept of structures.
2. Program to implement single Linked List.
3. Program to implement Doubly Linked List.
4. Program to implement Stack using Linked List.
5. Program to implement Queue using Linked List.
6. Program to implement Stack using arrays.
7. Program to implement Queue using arrays.
8. Program to Create and Copy a Tree.
9. Program to implement Tree Traversal.
10. Program to implement Insert and Delete Operation on Trees.
11. Program to implement AVL Trees.
12. Program to implement Warshal`s algorithm to find path matrix.
13. Program to implement Djikstra`s algorithm.
14. Program to implement Binary Search.
15. Program to implement Bubble, Selection, Insertion, Heap, Merge and Quick Sort.

Course Outcomes:

1. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
2. Understand basic data structures such as arrays, linked lists, stacks and queues. Describe the hash function and concepts of collision and its resolution methods
3. Solve problem involving graphs, trees and heaps
4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Note: This is only the suggested list of practical exercises. Instructor may add or change some practical's relevant to the course contents.

Course Title: Object Oriented Programming Using C++ Lab **Max Marks: 50**

Course Code: OEC-EE-332 / PCC-CSE-332 **University Exam: 25**

Duration of Exam: 2 hours **Internal Assessment: 25**

Credits: 1[0-0-2]

List of Experiments:

1. Program to break a number into its factors
2. Program to generate prime series from 1 to 100.
3. [Classes and Objects] Program to demonstrate the use of static data members.
4. [Classes and Objects] Program to demonstrate the use of friendly functions.
5. [Constructors and Destructors] Program to demonstrate the use of zero argument and parameterized constructors.
6. [Constructors and Destructors] Program to demonstrate the use of multiple constructors in a class (Overloaded constructors).
7. [Operator Overloading] Program to demonstrate the overloading of unary operators.
8. [Operator Overloading] Program to demonstrate the overloading of binary arithmetic operators.
9. [Operator Overloading] Program to demonstrate the overloading of binary arithmetic operators using friend function.
10. [Typecasting] Program to demonstrate the typecasting of basic type to class type.
11. [Typecasting] Program to demonstrate the typecasting of class type to class type.
12. [Inheritance] Program to demonstrate the multilevel inheritance.
13. [Inheritance] Program to demonstrate the multiple inheritance.
14. [Inheritance] Program to demonstrate the virtual derivation of a class.
15. [Polymorphism] Program to demonstrate the runtime polymorphism.
16. [Exception Handling] Program to demonstrate the exception handling.
17. [Templates and Generic Programming] Program to demonstrate the use of function template.
18. [Templates and Generic Programming] Program to demonstrate the use of class template.
19. [File Handling] Program to copy the contents of a file to another file byte by byte. The name of the source file and destination file should be taken as command-line arguments,
20. [File Handling] Program to demonstrate the reading and writing of objects.

Course Outcomes:

At the end of this course, the student will able to do the following:

1. Understanding and implementation of various object oriented programming concepts like inheritance, polymorphism, object and classes etc.
2. Designing the application using the object oriented concepts

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Fluid Mechanics Lab **Maximum. Marks: 50**
Course Code: OEC-EE-333/PCC-CE-332 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**
Credits 1(0-0-2)

List of Practical's:

1. To determine the density of a liquid (Water, oil, petrol)
2. To determine experimentally the Meta-centric height of a ship model.
3. To verify the Archimedes principle experimentally.
4. To verify the Bernoulli's equation experimentally.
5. To determine coefficient of discharge in an Orificemeter.
6. To determine coefficient of discharge in Venturimeter.
7. To determine the coefficients of discharge, velocity and contraction of a rectangular orifice.
8. To determine the coefficients of discharge, velocity & contraction of external cylindrical mouthpiece.
9. To determine the coefficients of discharge, velocity and contraction of a rectangular Notch.
10. To calibrate a sharp crested triangular Weir.

Course Outcomes: After the completion of the course the students will be able to

1. Understand about metacenter and measure meta centric height.
2. Measure the coefficients of contraction, discharge, velocity.
3. Carry out the flow measurements by orificemeter & venturimeter.
4. Understand about the boundary layers.
5. Measure the friction factor for commercial pipes.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester IV

Course Title: Numerical Techniques **Max. Marks: 100**
Course Code: BSC-EE-421 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This Course aims at providing the necessary basic concepts of a numerical techniques and give procedures for solving numerically different Kinds of problems occurring in engineering and technology.

Detailed Contents:

Unit-I

Solutions to Algebraic and Transcendental Equations: Solutions to algebraic and transcendental equations by iterative, Bisection, Regula-Falsi, Newton-Raphson methods and Secant Methods.

Unit-II

Interpolation: Finite-differences and operators, Relation between operators, Interpolation With Equal Intervals – Newton's Forward And Backward Difference Formulae, Interpolation With Unequal Intervals – Lagrange's Interpolation – Newton's Divided Difference Interpolation .

Unit-III

Numerical Differentiation & Integration: Introduction to Numerical differentiation and integration, Errors in Numerical differentiation, Trapezoidal rule, Simpson's one-third rule, Simpson's third-eight rule, Boole's rule and Weddle's rule, Newton-Cote integration formula.

Unit-IV

Matrix and Linear System of Equations: Direct Methods: Gauss and Gauss-Jorden method, Crout's Triangularization method, Iterative methods: Gauss –Jacobi and Gauss Seidel method, Newton method for nonlinear simultaneous equations

Unit-V

Numerical Solutions to Ordinary Differential Equations: Numerical solution of ordinary differential equations by Taylor's Series, Picard's method, Euler's method, Modified Euler's method and Runge-Kutta method of 4^{th} order, Finite-difference method for Boundary value problems

Course Outcome:

Upon the completion of this course, the students will:

CO1. Comprehend of the Power of Numerical Techniques, and Ideas.
CO2. Apply these techniques to problems drawn from Industry, Management and other engineering fields.
CO3. Demonstrate the ability to solve linear system of equations.
CO4. Solve various problems of linear and nonlinear differential equations by using numerical methods.

Text Books/References:

1. **Introductory Methods of Numerical Analysis,** S S Sastry, PHI

2. **Numerical Methods in Engineering and Science: (C, and C++, and MATLAB)**, B. S. Grewal, Khanna Publication
3. **Jain, M. K &Iyengar. S.R.K**, numerical method for scientific and engineering computation, 3rd edition, New Age Publishers
4. **Grasselli, M. &Pelinovsky, D**: Numerical Mathematics, Jones &Bratlett

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Renewable Energy Sources **Max. Marks: 100**
Course Code: PCC-EE-421 **University Exam: 60**
Duration of Exam: 3Hours **Internal Assessment: 40**
Credits: 4[3-1-0]

Course Objective: The course is designed to give knowledge of various renewable energy sources, systems and applications in the present context and need.

Detailed Contents:

Unit-I

Energy Scenario in India, Renewable and Non-renewable Energy sources, Causes of Energy Scarcity, Solution to energy Scarcity, Need for Renewable Energy, Advantages and Disadvantages of Renewable energy, Renewable Energy statistics worldwide and India.

Unit-II

Solar energy, solar photovoltaic, PV Technologies-Amorphous, Monocrystalline, polycrystalline-I characteristics of a PV cell, PV module, array, Maximum Power Point Tracking (MPPT) algorithms, Concentrated Solar Power, types of collectors, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, Application of Solar Power, Economic Policies to Promote Solar Energy.

Unit-III

Introduction, Electricity Generation using Wind Energy Generators (WEG), Evaluating Wind Turbine Performance, Wind Potential, Wind Energy in India, Wind Turbine Size and Power Ratings, Advantages of Wind-Generated Electricity, Cost Issues, Environmental Concerns, Supply and Transport Issues.

Unit-IV

Bio energy, Types of Bio Gas Plants, tidal energy, classification of Tidal Plants, Geothermal Power plants, ocean thermal energy systems, Open OTEC Cycle, Closed OTEC Cycle. Introduction to Magneto Hydro Dynamics (MHD) Power & fuel cells, types of fuel cells.

Unit-V

Energy storages: Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome:

After learning the subject, student will be able to:

CO1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources

CO2. Demonstrate the knowledge of physics of solar power generation and the associated issues.
CO3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.
CO4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.
CO5. Demonstrate the ways by which energy can be stored indifferent forms.

Text Books/References:

1. Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
2. Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
3. Non-conventional energy resources, Shobh Nath Singh, Pearson India
4. Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
5. Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Electrical Machine I **Max. Marks: 100**
Course Code: PCC-EE-422 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The student will be able to understand the basic concept and analyze the characteristics of electrical machines and transformer.

Detailed Contents:

Unit-I

Magnetic fields and magnetic circuits: Review of magnetic circuits - MMF, flux, reluctance, inductance; review of Ampere Law and Biot Savart Law. Influence of highly permeable materials on the magnetic flux lines. B-H curve of magnetic materials, linear and nonlinear magnetic circuits. Analogy between electrical and magnetic circuits.

Unit-II

Transformers I: Principle, construction and operation of single-phase transformers, equivalent circuit, phasor diagram, voltage regulation, losses, and efficiency Testing - open circuit and short circuit tests, polarity test, back-to-back (Hopkinson's) test, separation of hysteresis and eddy current losses Autotransformers - construction, principle, applications, and comparison with two winding transformers. Tap-changing transformers - No-load and on-load tap-changing of transformers. Transformer magnetizing current, effect of nonlinear B-H curve of magnetic core material, harmonics in magnetization current.

Unit-III

Transformers II:

Principle of operation, construction, three phase transformer connections, open delta (V-V) connection, Phase conversions of three phase transformer (Scott Connections), Transformer ratings, Parallel operation of single and three phase transformers.

Special purpose transformers – Impedance matching transformers, Isolation transformers, constant current & constant voltage transformers. Instrument transformers (Introduction)

Unit-IV

DC machines: Basic construction of a DC machine, magnetic structure - stator yoke, stator poles, pole-faces or shoes, air gap and armature core, visualization of magnetic field produced by the field winding excitation with armature winding open, air gap flux density distribution, flux per pole, induced EMF in an armature coil. Armature winding and commutation - Elementary armature coil and commutator, lap and wave windings, construction of commutator, linear commutation Derivation of back EMF equation, armature MMF wave, derivation of torque equation, armature reaction, air gap flux density distribution with armature reaction.

Unit-V

DC machine - motoring and generation: Armature circuit equation for motoring and generation, Types of field excitations - separately excited, shunt and series. Open circuit characteristic of separately excited DC generator,

back EMF with armature reaction, voltage build-up in a shunt generator, critical field resistance and critical speed. V-I characteristics and torque-speed characteristics of separately excited, Shunt and series motors. Speed control through armature voltage. Losses, load testing and back-to-back (Swinburne) testing of DC machines

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the basic concepts of magnetic circuits.
CO2. Able to explain the concept behind Electromagnetic force and torque.
CO3. Analyze single phase and three phase transformers circuits.
CO4. Understand the operation of dc machines.
CO5. Analyze the differences in operation of different dc machine configurations.

Text Books/References:

1. **A. E. Fitzgerald and C. Kingsley**, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. **A. E. Clayton and N. N. Hancock**, "Performance and design of DC machines", CBS Publishers, 2004.
3. **M. G. Say**, "Performance and design of AC machines", CBS Publishers, 2002.
4. **P. S. Bimbhra**, "Electrical Machinery", Khanna Publishers, 2011.
5. **I. J. Nagrath and D. P. Kothari**, "Electric Machines", McGraw Hill Education, 2010.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Electrical Measurement-I **Max. Marks: 100**
Course Code: PCC-EE–423 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Detailed Contents:

Unit-I

Measurement System & Characteristics of Instruments: Introduction, significance of measurements, methods of measurements, Instruments & measurement system, Classification of instruments – mechanical, electrical & electronic instruments, deflection & null type instruments, Comparison of Analog & digital modes of operation. Application of measurement systems, errors in measurements, types of errors. Accuracy, Precision, Resolution, loading effects. Units-Absolute, Fundamental & derived.

Unit-II

Bridge Circuits: Wheatstone Bridge- galvanometer sensitivity, current through galvanometer & limitations, Kelvin Double Bridge, Maxwell Inductance Bridge, Maxwell inductance–capacitance Bridge, Anderson's bridge, Schering Bridge, Hay Bridge & Wien's Bridge. Measurement of effective resistance, inductance & capacitance at high frequency Meter.

Unit-III

Electro-mechanical Indicating Instruments: D Arsonval Galvanometer- construction & theory, Torque equation, Dynamic behavior & Galvanometer constants. Ballistic galvanometer- construction & theory. Introduction to PMMC Instruments and Moving Iron Instruments.

Unit-IV

Ammeters, Voltmeters: DC Ammeter, Multi-range Ammeter, RF Ammeter. DC Voltmeter, Multi-range Voltmeter, Extending ammeter & Voltmeter Ranges- Multipliers & shunts, The Aryton Shunt or Universal Shunt, Requirements of a Shunt, Introduction to Instrument Transformers & their application to extension of Instrument range.

Unit-V

Measurement of Energy & Power: Measurement of power in three phase AC circuits using single phase & three phase wattmeter, Measurement of reactive power (single phase & three phase), Measurement of energy using Induction type meter, Energy meter testing, Power factor meter.

Course Outcome:

The student will learn:

CO1. Introduction to Measurement System & Characteristics of Instruments.

CO2. Exposure to the Bridge Circuits and to learn various measurements techniques used for the measurement of capacitance and inductance.

CO3. Exposure to Electromechanical Indicating Instruments.

CO4. Exposure to various types of Ammeters and Voltmeters.

CO5. Exposure to different methods used in the measurements of Energy & Power.

Text Books/References:

1. **Albert D.Helfrick and William D. Cooper**, "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2007.
2. **Ernest o Doebelin and dhanesh N manik**, "Measurement systems" ,5th edition ,McGraw-Hill, 2007.
3. **John P. Bentley**, "Principles of Measurement Systems", Fourth edition, Pearson Education Limited, 2005.
4. **A. K. Sawhney**, "Course In Electrical And Electronic Measurement And Instrumentation", DhanpatRai Publisher, 2000.
5. **Bouwens,A.J**, "Digital Instrumentation", Tata Mc-Graw Hill, 1986.
6. **David A.Bell**, "Electronic Instrumentation and Measurements", Second edition, Prentice Hall of India, 2007.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting one from each unit.

Course Title: Open Elective courses-II **Max. Marks: 100**
Course Code: OEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: _____

Open Elective Courses-II

Course Title: Python Programming **Max Marks: 100,**

Course Code: OEC-EE-421/PCC-CSE-422 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits: 3[3-0-0]

Course Objective: Python is a modern language useful for writing compact code specifically for Programming in Server-Side web Development, AI, data analytics and Game Programming. This course covers the basics and advanced python programming to harness its potential for modern computing requirements

Unit-I

Introduction to Python: Introduction to Python, History, Installation and Working, Understanding variables, basic operators, and blocks. Declaring and using Numeric and string data type, defining list and list slicing, Use of Tuple data type, working with sequence. Flow Control: Conditional blocks using if, else and else if, loops in python for loop, while loops in python, Loop manipulation using pass, continue, break and else Programming.

Unit-II

Python Functions, Modules and Packages: Organizing python codes using functions, modules. Importing own module as well as external modules, Understanding Packages, Powerful Lamda function. Python String, List, tuple, set and Dictionary Manipulations:

Unit-III

Python Object Oriented Programming –Concept of class, object and instances, Constructor, class attributes and destructors, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support. Multithreading: Understanding threads, forking threads, synchronizing the threads, Programming using multithreading. Working with System (sys Module), Working with Operating System (os module).

Unit-IV

Python File Operation: Reading and Writing files in python, read functions and write functions, manipulating file pointer using seek, Programming using file operations. Python Regular Expression: pattern matching and searching using regex in python, Real time parsing of networking or system data using regex, Password, email, URL validation using regular expression

Unit-V

Python Exception Handling: Avoiding code break using exception handling, Handling and helping developer with error code, Built-in exception. Database Interaction**:** SQL Database connection using python, Creating and searching tables, Reading and storing config information on database, Programming using database connections

Course Outcomes: At the end of this course, the students will able to do the following:

1. To understand data and the operations that can be applied to each data type
2. To write programs that get input, perform calculations, and provide output
3. To understand the OOPs concepts with respect to fourth generation language
4. To write well designed and well documented programs that is easily maintainable.
5. To test and debug programs (find out what is wrong and fix it)**.**

Text Books:

1. **R. Nageswara Rao**, "Core Python Programming", Dreamtech.
2. **Wesley J. Chun.,** "Core Python Programming", -2nd Edition Prentice Hall.
3. **Kenneth A. Lambert**, "The Fundamentals of Python: First Programs", 2011, Cengage Learning,

Refercence Books:

1. **Luke Sneeringer,** "Professional Python", Wrox.
2. **John V Gutttag.,** "Introduction to Computation and Programming using Python", PHI.
3. **Allen B. Downey,** "Think Python", Green Tea Press, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Unix/Linux & Shell Programming **Max Marks: 100**

Course Code: OEC-EE-422/PCC-CSE-425 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Credits: 3 [3-0-0]

Course Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, overview of the concept of buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipesystem call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes: process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control: process creation, signals, process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter Process communication, process tracing, network communication, sockets, Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Understanding the concept of shell programming
2. Understanding the working of kernel and implementing them.
3. Implementing the system calls, process management, and inter process communication
4. Understand Shell Programming and its implementation.
5. Understanding Semaphores along with interprocess communication.

Text Books:

1. **Maurice J Bach.,** The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S. Eric**, The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,** Advanced Unix Programming.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Linear Integrated circuits & Pulse Switching **Max Marks: 100**
Course Code: OEC-EE-423/PCC-ECE-424 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3[3-0-0]

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of OPAMP based linear and Non-linear circuits and different wave shaping circuits.

Unit-I

Op-Amplifier Fundamentals:

Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features,Basic Op -Amp circuit, Op-Amp parameters – Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate and Frequency limitations; Biasing of Op-Amps.

Unit-II

Linear and Non-Linear applications of OP-Amps:

Linear applications:-Voltage Followers, Non-inverting & Inverting amplifiers, Summing amplifiers, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters.

Non-Linear applications:-Basic comparator & its characteristics, zero crossing detector, Inverting and non-inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

Unit-III

Active Filters and Oscillators

Filters:-Butterworth Filters Low pass filter, High pass filter, Band-Pass Filters, Band Reject Filters, All-Pass Filters.

Oscillators:- Phase Shift Oscillator, Wien Bridge Oscillator, Voltage-Controlled Oscillator(VCO)

Unit-IV

Switching and waveshaping circuits: Linear wave shaping circuits: High Pass circuits, Low pass circuits, Differentiator, Integrator, RLC circuits, Ringing circuits. Clamping Theorem.

Time- base Generators: Time- base Generators, Methods of generating a time –base waveform, exponential sweep circuit, sweep circuit using UJT, sweep circuit using a transistor switch, Miller and Bootstrap time base generators-basic principles.

Unit-V

Timers, Blocking Oscillators & Phase Locked Loops: Introduction to 555 timer- its applications as Monostable and Astable multivibrators, Linear voltage regulators- protection mechanism- LM 723 functional diagram, functional operation of 78xx series IC and design of fixed and adjustable regulators. Blocking- Oscillator, Astable transistor blocking oscillator (Diode-controlled and RC-controlled), Application of blocking oscillator. Phase Locked Loop, frequency multiplication, frequency translation.

Course Outcomes:

After completion of the course student will be able to:

CO1. Solve Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate of op-amps.

CO2. analyze and design Voltage Followers, Non-inverting & Inverting amplifiers, Summing amplifiers, Instrumentation amplifier, AC amplifier, V to I, I to V converters using Op-Amps

CO3. Analyze and design zero crossing detector, Inverting and non-inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers using Op-amps

CO4. Analyze Time- base Generators, Timers, Blocking Oscillator and Phase Locked Loops

Text Books:

1. C**howdhury D. Roy**, Linear Integrated Circuits, New Age International (p) Ltd, 2nd Ed., 2003.
2. **Ramakant A. Gayakwad**, 'OP-AMP and Linear IC's', Prentice Hal, 1999.

Reference Books:

1. Sergio Franco, 'Design with operational amplifiers and analog integrated circuits', McGraw-Hill, 2002
2. **Coughlin R.F. & Driscoll Fredrick**- Operational Amplifiers & Linear Integrated Circuits, PHI.
3. **J. Michael Jacob**, 'Applications and Design with Analog Integrated Circuits', Prentice Hall of India, 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will beset from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Computer-Aided Simulation Lab **Max. Marks: 50**
Course Code: PCC-EE-431 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The laboratory is all about the modeling and design of various aspect of Electrical engineering.

List of Experiments

1. Introduction to MATLAB, Coding and Simulation.
2. Computation of parameters and modeling of transmission lines
3. Formation of bus admittance and impedance matrices.
4. Solution of power flow using gauss-seidel method.
5. Short circuit analysis.
6. Solution of power flow using Newton-Raphson method.
7. Load – frequency dynamics of single area power systems.
8. Load – frequency dynamics of two area power systems.
9. Transient and small signal stability analysis–single machine infinite bus system.
10. Transient stability analysis – multi machine infinite bus system.
11. Economic dispatch in power systems.
12. To learn the design algorithms of electrical machines
13. Design of transformer, its windings and core.
14. Design of DC Series machine.
15. Design of DC Shunt machine.
16. Design of wound rotor induction machine.
17. Design of squirrel cage induction machine.
18. Design of single-phase induction machine.
19. Design of synchronous machine.

Laboratory Outcomes

The students will be

CO1. Able to model and compute transmission line parameter.
CO2. Perform load flow for line flows.
CO3. Stability analysis.
CO4. Economical Load dispatch.
CO5. Able to design various types machine on MATLAB.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Renewable Energy Sources Lab. **Max. Marks: 50**
Course Code: PCC-EE-432 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: To understand the working of various renewable energy resources.

List of Experiments:

1. Study of the voltage and current of solar cells.
2. Study of voltage and current of the solar cells in series and parallel calculation.
3. Study of both I-V characteristics and the power curve to find the MMP and efficiency.
4. To calculate the efficiency of solar cell.
5. Study of the application of solar cells of charging Ni-Cd battery so that the loads can be used while the module is unexposed to light.
6. Study of the application of solar cells of providing electrical energy to the domestic appliances such as lamp, fan and radio.
7. Installation of wind turbine set up and measurements of wind energy based DC voltage and current.
8. Measurement of voltage and current of wind energy based DC supply with the change in angle of blades.
9. Measurement of V-I (voltage and current) of wind energy based DC supply with change in direction of wind.
10. Measurement of V-I (voltage and current) of wind energy based DC supply with change in speed of wind imposed on the blade.
11. Study of the application of wind energy based DC supply of changing the Ni-Cd battery so that the load can be used even while the module is unexposed to wind.
12. Study of the application of wind energy based DC supply of providing electrical energy to the domestic application such as lamp, fan FM receiver etc.

Laboratory Outcomes:

Student will

CO1. Understand the V-I characteristics of Solar cell.
CO2. Able to evaluate MPP and efficiency.
CO3. Able to understand the installation of wind turbine.
CO4. Able to measure V-I of wind energy based DC supply but changing various means.
CO5. Able to understand the application of wind energy based DC supply system.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Open Elective Lab courses-II **Max. Marks: 50**
Course Code: OEC-EE-(---) **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**
Credits: _____

Open Elective Lab Courses-II

Course Title: Python Programming Lab **Max Marks: 50**
Course Code: OEC-EE-431/PCC-CSE-431 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**
Credits: 1[0-0-2]

Lab Objectives:

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

List of Programs:

1. Write a program to demonstrate different number datatypes in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and accessing substring from a string.
4. Write a python script to print the current date in following format
5. Write a python script to use string methods
6. Write a python program to create, append and remove lists in python.
7. Write a program to demonstrate working with tuples in python
8. Write a program to demonstrate working with dictionaries in python
9. Write a program to check whether a number is oven or odd using if condition
10. Write a program to demonstrate for loop
11. Write a program to demonstrate while loop
12. Write a program to display prime numbers between 50 to 60
13. Write a program to display Fibonacci series
14. Write a program to display Armstrong number
15. Write a program to display address of variables
16. Write a program to implement Function in python
17. Function call with tuple and dictionary
18. Write a program to implement modules
19. Write a program to implement ladders and snake game
20. Write a program to implement dir function in modules
21. Write a program to explore math module
22. Write a program to explore datetime module
23. Write a program to explore lambda functions
24. Write a program to implement linear search

COURSE OUTCOME: Upon completion of the course, students will be able to:

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Unix /Linux and Shell Programming Lab **Max Marks: 50**
Course Code: OEC-EE-432/PCC-CSE-433 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**
Credits: 1[0-0-2]

Lab Objective: The lab course will address the demand for Information technology professionals with UNIX training and experience.

List of Experiments:

1. Using the visual editor (vi) and the Pico editor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administration issues.
8. Practicing various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web server configuration.

Lab Outcomes: Upon completion of this course, the student will be able to:

1. Run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. Run C / C++ programs on UNIX.
3. Do shell programming on UNIX OS.
4. Understand and handle UNIX system calls.

Note: This is only the suggested list of experiments. Instructor may frame additional experiments relevant to the course contents

Course Title: Linear Integrated Circuits Lab **Max Marks: 50**
Course Code: OEC-EE-433/PCC-ECE-433 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

List of Experiments

1. Study of OP AMPs – IC 741, IC 555, – Functioning, Parameters and Specifications.
2. To demonstrate the relationship between input and output for the inverting and non-inverting configuration of the Op-Amp 741
3. To perform the Application operation – Adder, Subtractor, Comparator Circuits using IC741.
4. To design a square wave and triangular wave generator using Op-amp's.
5. Active Filter Applications – LPF, HPF (first order & 2^{nd} order)
6. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
7. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
8. IC 555 Timer – Monostable Operation Circuit.
9. IC 555 Timer – Astable Operation Circuit.
10. Schmitt Trigger Circuits – using IC 741 and IC 555.
11. IC 565 – PLL Applications.

Course Outcomes:

After completion of the course student will be able to:

CO1. Establish relationship between input and output for the inverting and non-invertingconfiguration of the Op-Amp 741
CO2. Perform arithmetic operation using IC-741
CO3. Design 1^{st} order and 2^{nd} order active filters using IC-741
CO4. Implement Schmitt trigger circuits using IC-741 & IC-555
CO5. Design square wave and triangular wave generators using op-amps

Note: This is only the suggested list of experiments. Instructor may frame additional experiments relevant to the course contents

Semester V

Course Title: Power System-I **Max. Marks: 100**
Course Code: PCC-EE-521 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to develop an understanding of the diverse concepts of power system generation, transmission and distribution. It also involves the study of various power transfer methods and phenomenon associated with power system.

Detailed Contents:

Unit-I

Electric Supply System: Typical A.C. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Advantages of High Transmission Voltage, Various Systems of Power Transmission, Economic Choice of Conductor Size, Economic Choice of Transmission Voltage, Requirements of satisfactory electric supply, Main components of Overhead Lines, Conductor Materials, Bundled Conductors, Line Supports, Insulators, Type of Insulators, Potential Distribution over Suspension Insulator, String Efficiency, Methods of Improving String Efficiency, Corona, Factors affecting Corona, Advantages and Disadvantages of Corona, Methods of Reducing Corona Effect, Sag in Overhead Lines, Calculation of Sag, Some Mechanical principles.

Unit-II

Distribution System: Classification of Distribution Systems, Methods of obtaining 3-wire D.C. System, Connection Schemes of Distribution System, Requirements of a Distribution System, Design Considerations in Distribution System. Types of D.C. Distributors, D.C. Distribution Calculations, D.C. distributor fed at one end (concentrated loading), Uniformly loaded distributor fed at one end, Distributor fed at both ends(concentrated loading), Uniformly loaded distributor fed at both ends, Distributor with both concentrated and uniform loading, Ring Distributor, Ring main distributors with Interconnector, 3-wire D.C. system, Current distribution in 3-wire D.C. System, Balancers in 3-wire D.C. system, Booster, Comparison of 3-wire and 2-wire D.C. distribution, Ground detectors. A.C. Distribution Calculations, Methods of solving A.C. Distribution Problems, 3-phase unbalanced loads, 4-wire, star-connected unbalanced loads, Ground detectors.

Unit-III

Line Parameter Calculations: Resistance of a Transmission Line, Skin effect, Flux Linkages, Inductance of a Single Phase Overhead Line, Inductance of a 3-Phase Overhead Line, Concept of self-GMD and mutual GMD, Inductance Formulas in terms of GMD, Electric Potential, Capacitance of a Single Phase Overhead Line, Capacitance of a 3-Phase Overhead Line.

Unit-IV

Classification of overhead Transmission Lines: Performance of Single Phase Short Transmission Lines, Three-Phase Short Transmission Lines, Effect of load p. f. on Regulation and Efficiency, Medium Transmission Lines, End Condenser Method, Nominal T Method, Nominal Π Method, Long Transmission Lines, Analysis of Long Transmission Line, Generalised Constants of a Transmission Line, Determination of Generalised Constants for Transmission Lines.

Unit-V

Underground Cables: Construction of Cables, Insulating Materials for Cables, Classification of Cables, Cables for 3-PhaseService, Laying of Underground Cables, Insulation Core Cable, Dielectric Stress in a Single Core Cable, Most Economical Conductor Size in a Cable, Grading of Cables, Capacitance Grading, Inter sheath Grading, Capacitance of 3-Core Cables, Measurement of Cc and Ce, Current carrying capacity of underground cables, Thermal resistance, Thermal resistance of dielectric of single-core cable, Permissible current loading, Types of cable faults, Loop tests for location of faults in underground cables, Murray loop test, Varley loop test.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the various concept of power system and realize its importance.

CO2. Understand the working of various distribution systems

CO3. Understand the various constants of transmission lines

CO4. Evaluate performance analysis on transmission lines

CO5. Understand various Underground Cables

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.
2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
3. **A. R. Bergen and V. Vittal,** "Power System Analysis", Pearson Education Inc., 1999.
4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.
5. **B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac**, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Signals & Systems **Max. Marks: 100**
Course Code: PCC-EE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to study and analyze the characteristics of continuous, discrete signals and systems**.**

Detailed contents:

Unit-I

Introduction: Definitions of a signal and a system, Signals and systems everyday life, Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids, Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Signal properties: periodicity, absolute integrability, determinism and stochastic character.

Unit-II

Time-domain representations for LTI systems–1: Convolution and its significance, impulse response representation, Convolution Sum and Convolution Integral, Relationship between LTI system properties and the impulse response i.e., Causality, Stability, Step response

Unit-III

Fourier representation for signals: Fourier representation for signals, Continuous -time Fourier series and their properties, Application of Fourier Series to LTI systems, Continuous – time Fourier Transform & its properties, Applications of Fourier Transform to LTI systems, Fourier transform of periodic signals, Discrete-time Fourier Transform and its properties.

Unit-IV

Laplace Transforms-1: Introduction, Laplace transform, Region of convergence (ROC) and its properties, properties of Laplace transforms, inverse Laplace transform using partial fraction method, Transform analysis of LTI Systems, unilateral, Initial and final value theorems, Poles and Zeros of a system.

Unit-V

The Z Transform: Z-Transform- Unilateral and Bilateral, Properties of the Z-transform, Transform analysis of LTI Systems, Unilateral Z-transform and its application to difference equations with zero and non-zero initial condition. Block diagram representation in Z-Domain.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the concepts of continuous time systems.
CO2. Understand the time domain representation of LTI system using convolution.
CO3. Analyze systems in complex frequency domain.

CO4. Understand s-domain representations of systems and its applications to analyze electrical circuit.

CO5. Understand Z-transform in context with digital signals.

Text Books/References:

1. **V. Oppenheim, A. S. Willsky and S. H. Nawab**, "Signals and systems", Prentice Hall India, 1997.
2. **J. G. Proakis and D. G. Manolakis**, "Digital Signal Processing: Principles, Algorithms, and Applications", Pearson, 2006.
3. **H. P. Hsu**, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. **S. Haykin and B. V. Veen**, "Signals and Systems", John Wiley and Sons, 2007.
5. **A. V. Oppenheim and R. W. Schafer**, "Discrete-Time Signal Processing", Prentice Hall, 2009.
6. **M. J. Robert** "Fundamentals of Signals and Systems", McGraw Hill Education, 2007.
7. **B. P. Lathi**, "Linear Systems and Signals", Oxford University Press, 2009.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit

Course Title: Electrical Machine-II **Max. Marks: 100**
Course Code: PCC-EE-523 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of AC Machines. Emphasis is given to latest technologies.

Detailed Contents:

Unit-I

Fundamentals of AC machine windings: Physical arrangement of windings in stator and cylindrical rotor; concentrated winding, distributed winding. Sinusoidally distributed winding, winding distribution factors. Revolving magnetic field by three windings spatially displaced by 120 degrees (carrying three-phase balanced currents).

Unit-II

Induction Machines: Construction, Types (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque. Equivalent circuit. Phasor Diagram, Losses and Efficiency. Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency).

Methods of starting, braking and speed control for induction motors. Generator operation. Self-excitation. Doubly-Fed Induction Machines.

Unit-III

Synchronous machines: Constructional features, cylindrical rotor synchronous machine-generated EMF, equivalent circuit and phasor diagram, armature reaction, synchronous impedance, voltage regulation. Operating characteristics of synchronous machines, V-curves. Salient pole machine - two reaction theory, analysis of phasor diagram, power angle characteristics. Parallel operation of alternators - synchronization and load division.

Unit-IV

Single-phase induction motors: Constructional features and principal of operation of single-phase induction motors. Double revolving field theory, field produced by spatially displaced windings by 90 degrees.Equivalent circuit of single-phase induction motors. Short and blocked rotor tests in single phase induction motors. Different types of self-starting methods of single-phase induction motors and their applications.

Unit-V

Special Machines

Universal motors-application and speed control, reluctance motors, Hysteresis motors,
Stepper motors and its types, Permanent magnet DC motors, BLDC motors.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the fundaments of ac machine winding.

CO2. Understand the concepts of rotating magnetic fields.

CO3. Understand the operation and characteristics of 3-phase Induction machines.

CO4. Understand the operation and characteristics of 1-phase Induction machines.

CO5. Understand the constructional features, operation and characteristics of Synchronous machines.

Text Books/References:

1. **A. E. Fitzgerald and C. Kingsley**, "Electric Machinery", McGraw Hill Education, 2013.
2. **M. G. Say**, "Performance and design of AC machines", CBS Publishers, 2002.
3. **P. S. Bimbhra**, "Electrical Machinery", Khanna Publishers, 2011.
4. **I. J. Nagrath and D. P. Kothari**, "Electric Machines", McGraw Hill Education, 2010.
5. **A. S. Langsdorf**, "Alternating current machines", McGraw Hill Education, 1984.
6. **P. C. Sen**, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Applied Electronics **Max. Marks: 100**
Course Code: PCC-EE-524 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Credits: 4 [3-1-0]

Course Objective: The course is designed to introduce the students with advance electronic circuits and applications in fabrications of various devices.

Detailed Contents:

Unit-I

Low frequency transistor amplifier and multistage amplifier: Equivalent circuit of BJT using h parameter for CB, CE and CC &configuration, calculation of transistor parameter for CB, CE, & CC using h parameter, comparison of transistor amplifier configuration.

Unit-II

Multistage & Power Amplifier: Multistage Amplifier: General cascaded system, RC coupled amplifier and its frequency response merits and demerits cascade amplifier, Darlington compound configuration multistage frequency effect.

Class A Power Amplifier, Maximum value of efficiency of class A Amplifier ,Transformer coupled Amplifier, Transformer coupled Audio Amplifier , Push pull Amplifier, Complimentary symmetry circuits (Transformer less class B power amplifier).

Unit-III

Operational Amplifier fundamentals: Dc analysis of dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output), single ended input-balanced /unbalanced output), DC coupling and cascade differential amplifier stages, level translator.

Basis Op-Amp circuit ,Op-Amp parameters-Input and output voltage ,CMRR AND PSRR, offset voltages and currents ,input and output impedances ,slew rate and frequency limitations; biasing of Op -Amps.

Unit-IV

Linear &Non Inverting Application of OP Amps: Voltage followers, Non Inverter Amplifiers, Inverting, Summing Amplifiers, Integrator and differentiator, Difference amplifier.

Comparators, inverting Schmitt trigger circuits, Monostable and Astable multivibrator, Triangular and Square wave generators.

Unit V

Active Filters, Timers & Phase locked loops: Butter worth filters first order, second order LPF, HPF filter, band pass, Band Reject and all pass filter. Introduction to 555 timer, function diagram, Monostable and Astable operation and applications, Schmitt trigger. PLL– introduction, block

schematic, principal and description of individual block, 565 PLL, Application of PLL-Frequency multiplication, frequency translation.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Analyze BJT amplifiers in different configurations at low frequency.

CO2. Classify power amplifier and analyze performance of different power amplifiers. Also understand the concept of multistage amplifiers.

CO3. Understand the Operational amplifier fundamentals.

CO4. Design and analyze various circuits using operational amplifier.

CO5. Understand the concept of 555 timer and phase locked loop.

Text Books/References:

1. **A. S. Sedra and K. C. Smith**, "Microelectronic Circuits", New York, Oxford UniversityPress, 1998.
2. **J. V. Wait, L. P. Huelsman and G. A. Korn**, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.
3. **J. Millman and A. Grabel**, "Microelectronics", McGraw Hill Education, 1988.
4. **P. Horowitz and W. Hill**, "The Art of Electronics", Cambridge University Press, 1989.
5. **P. R. Gray, R. G. Meyer and S. Lewis**, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons, 2001.

Note: - For paper setter: the question paper shall comprise of ten questions. Two questions will be set each unit. The student has to attempt five questions. Select one question for each unit.

Course Title: Open Elective courses-III **Max. Marks: 100**
Course Code: OEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: _____

Open Elective Courses III

Course Title: Cyber-crime and Laws **Max. Marks: 100**
Course Code: OEC-EE-521/PEC-CSE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objectives: To maintain an appropriate level of awareness, knowledge and skill required to minimize the occurrence and severity of incidents related to cybercrimes, digital forensics and cyber law.

Unit-I

Introduction to Cyber law and Computer Forensics: What is Cyber Law, Need for Cyber Law, Indian Cyber Law, Information Technology Act, Relevant Cyber Crimes other than IT Act, 2000, what is computer Forensics, Objectives of computer Forensics, Computer Forensics Services, Steps Taken by Computer Forensics Specialists, Who can use Computer Forensic Evidence, Problems with Computer Forensic Evidence.

Unit-II

Cyber Crimes: Introduction to Cyber Crime, Defining Cyber Crime, Frequently Used Cyber Crimes, Reasons for Cyber Crime, Cyber Criminals, Mode and Methods of Committing Cyber Crimes, Motive Behind Any Attack, Classification of Cyber Crime.

Unit-III

Computer Investigation Process: The concept of cyber security, meaning, scope and the frame work, Collecting and preserving Evidence.

Unit-IV

Constitutional & Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace –Access to Internet, Right to Privacy, Right to Data Protection

Unit- V

Intellectual Property in Cyberspace

The Concept of Intellectual Property, The World Intellectual Property Organization (WIPO)-History and structure, Fields of Intellectual Property Protection-Patents, Copyright and Related Rights, Trademarks, Protection Against Unfair Competition

Course Outcomes: On successful completion of this course students will be able to

1. Understand basic concepts of cyber laws.
2. Understand the various types of cybercrime.
3. Understand the concept of cyber security and methods for Collecting and preserving Evidence.
4. Understand the definition of Freedom of Speech and Expression in Cyberspace
5. Understand the concept of Intellectual Property.

Text Books:

1. **Marie - Helen Maras, Jones & Bartlett Learn,** Computer Forensics: Cybercriminals, Laws, and Evidence, ,1st Edition ,2011

2. Computer Forensics: Investigating Network Intrusions and Cyber Crime, EC Council Press Series, Cengage Learning , 2010
3. **Stuart McClure, Joel SeatnbraV and George Kurtz**, Hacking Exposed: Network Security Secrets & Solutions, , McGraw-Hill, 2005

Reference Books:

1. **Justice Yatindra Singh**, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).
2. **Albert J. ,Marcella Jr** ,Cyber Forensics: from Data to Digital Evidence ,Wiley,1st Edition,2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Course Title: Internet of Things **Max. Marks: 100**
Course Code: OEC-EE-522/PEC-CSE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course objectives: The main objectives of this course are:

1. To assess the vision and introduction of IoT.
2. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
3. To Understand State of the Art - IoT Architecture.
4. To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Unit-I

Introduction to Internet of Things - What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.

Unit -II

IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security

Unit-III

IoT Architecture: IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.

Unit-IV

Web of Things - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.

Unit-V

IoT Applications: IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Course Outcomes: After completion of this course, the students will able to do following:

1. Interpret the vision of IoT from a global context.
2. Compare and contrast the use of Devices, Gateways and Data Management in IoT.
3. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
4. To study and analyse data and to understand the security issues in IoT
5. To study IoT physical devices and end points and to understand the communications between components

Textbook:

1. **Honbo Zhou**, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012.
2. **Dieter Uckelmann, Mark Harrison, Michahelles, Florian** (Eds), "Architecting the Internet of Things", Springer, 2011.
3. **David Easley and Jon Kleinberg**, "Networks, Crowds, and Markets: Reasoning About a HighlyConnected World", Cambridge University Press, 2010.
4. **Olivier Hersent, David Boswarthick, Omar Elloumi** , "The Internet of Things – Key applicationsand Protocols", Wiley, 2012.

Reference Books:

1. **Vijay Madisetti and Arshdeep Bahga**, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014
2. **Francis da Costa**, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything", 1st Edition, Apress Publications, 2013
3. **CunoPfister**, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1- 4493-9357-1

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Industrial Electronics **Max Marks: 100**
Course Code: OEC-EE-523/PEC-ECE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

D.C. Motor Control: Control of DC motor using half controlled and fully-controlled single-phase and three-phase thyristor converters, control of DC motor using choppers of different configurations.

Unit-II

A.C. Motor Control: Stator voltage control of induction motors, control of induction motors using voltage source and current source inverters, slip-ring induction motor control.

Unit-III

Industrial circuits: Temperature control circuit, AC voltage regulators, fan regulators/ lamp dimmers, uninterrupted power supplies (UPS). Relays and Timers: The relay (basic construction), AC relay, Reed relay, Solid state relay, 555 timer and its industrial applications.

Unit-IV

Design of Printed Circuit Boards: Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

Unit-V

Industrial Appliances Design: Power Transformers and Voltage Stabilizers, Design of 0.5 and 1.0KVA Voltage Stabilizers, Design of Inverters and Battery Chargers for domestic use.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Control speed of DC motors.
- **CO2.** Control speed of AC motors.
- **CO3.** Gain knowledge of various Industrial Components.
- **CO4.** Understand PCB design rules. Design of PCB using computer aided tools.
- **CO5.** Design Power transformers, voltage stabilizer, inverter and battery charger.

Text Books:

1. **Mohan N Undeland, T.M. Robins, W.P**. "Power electronics- converters, application & design", John Wiley 1989
2. **Bose B.K**., "Power electronics and A.C Drives", Prentice Hail 1986.

Reference Books:

1. **Dubey G.K. Asarbada, E.R, K**., "Power electronics devices", IETE book, TMH.
2. **Murphy J. M. D Turnnbull, F.G,** "Power electronics control of A.C motors".

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Biomedical Instrumentation **Max Marks: 100**
Course Code: OEC-EE-524/PEC-ECE-725 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the course is to get the students acquainted with the Biomedical Instrumentation.

Unit-I

Introduction to biomedical instrumentation: Introduction of Biomedical Engineering, Biometrics, Man instrument system, Components of Man instrument system. Resting potential, action potential, typical wave form of action potential, propagation of action potential, recording of action potential.

Unit-II

Electrodes, Transducer and Amplifiers: Introduction of Bio-Electrodes, Properties of Bio-Electrodes, different types of electrodes, Sensors, Diaphragms, Force sensors. Introduction of transducers, classification of transducers, Biological Amplifiers (Instrumentation amplifies, chopper amplifiers)

Unit-III

Electro Potential Recording: The heart and cardiovascular system, ECG, EEG, EMG, lead systems and recording methods, typical waveforms and signal characteristics and block diagrams of ECG, EEG, EMG.

Unit-IV

Human Assist Devices: Cardiac pacemakers, Classification of Pacemakers, Defibrillators, AC Defibrillators, DC Defibrillators, Indirect measurement, direct measurement, automated indirect method, magnetic blood flow meters, ultrasonic blood flow meter.

Unit-V

Imaging Techniques: Introduction to X-rays, Properties of X-rays, Production of X-rays, Block Diagram of X-ray Machine, Ultrasound in medicine, physics of ultrasonic waves, types, A-mode, M-Mode, Doppler mode, Introduction of Computed tomography, Introduction of MRI.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand biomedical instrumentation, propagation of action potential.
- **CO2.** Acquire knowledge of electrodes, transducers & amplifiers used in biomedical instrumentation.
- **CO3.** Apply the knowledge of science, engineering fundamentals & engineering specialization for electrode potential recording.
- **CO4.** Understand different human assist devices.
- **CO5.** Gain knowledge of different imaging techniques used in medical science.

Text Books:

1. **Khandpur, R.S**., "Handbook of Biomedical Instrumentation", TATA McGraw-Hill, New Delhi, 1997.

Reference Books:

1. **Joseph J. Carr and John M. Brown**, Introduction to Biomedical Equipment Technology, John Wiley and Sons, New York, 1997.
2. **Leislie Cromwell**, Biomedical instrumentation and measurement, Prentice Hall of India, New Delhi, 2002

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Disaster Preparedness & Planning **Max Marks: 100**
Course Code: OEC-EE-525/PCC-CE-325 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [2-1-0]

Course Objective: To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences and to ensure skills and abilities to analyze potential effects of disasters and of the strategies and met to deliver public health response to avert these effects.

UNIT: I

Disaster and Hazards

Definition of vulnerability, risk, capacity, impact, prevention, mitigation. ecological fragility; Factors affecting vulnerability; Sustainable and environmental-friendly recovery; Reconstruction and development.

UNIT: II

Classification of Disasters

Natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.), Causes of natural disasters; Man-made disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills), Causes and concern of man-made disasters.

UNIT III:

Disaster Impacts

Disaster impacts- Global (Climate change), regional (urban disasters) and local- environmental impacts (physical, social, ecological, economic, political, etc.), health impacts, psycho-social issues; demographic aspects (gender, age, special needs), Impact evaluation and analysis.

UNIT IV:

Disaster Risk Reduction: Disaster management cycle phases; prevention, mitigation, preparedness, relief and recovery; Structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; Early warning systems, Post-disaster environmental response, Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT V:

Disasters management and control: Management of natural disasters (Earthquake, flood and drought), Various components and their functions; Man-made disasters (Industrial and nuclear disaster)-management and control, preventives measures, regulatory aspects.

Course Outcomes: At the end of completion of subject students will able to understand:

1. Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.

2. Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.

3. Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.

4. Capacity to manage the Public Health aspects of the disasters.

5. Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Text Books:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority). 64

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. **Pradeep Sahni**, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

Reference Books:

3. **Singh B.K.,** 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.

4. **Ghosh G.K.,** 2006, Disaster Management, APH Publishing Corporation.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each

Course Title: Biology& Life Science **Maximum Marks: 100**
Course Code: OEC-EE-526/PCC-CE-326 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**
Credits 3 (2-1-0)

Course Objective: The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.

Unit I

Basic Cell Biology: Introduction: Methods of Science-Living Organisms: Cells and Cell theory Cell Structure and Function, Genetic information, protein synthesis, and protein structure, Cell metabolism Homoeostasis- Cell growth, reproduction, and differentiation**.**

Unit II –

Biochemistry and Molecular Aspects of Life: Biological Diversity --Chemistry of life: chemical bonds-Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

Unit III

Enzymes and Industrial Applications: Enzymes: Biological catalysts, Proteases, Carbonic anhydrase, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

Unit IV

Mechanochemistry: Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

Unit V

Nervous System, Immune System, and Cell Signaling: Nervous system--Immune system-General principles of cell signaling

Course Outcomes:

1. Students will understand the Basic of Cell.
2. To familiarize the students with the basic organization of organisms and subsequent building to a living being.
3. To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.
4. To provide knowledge about biological problems that requires engineering expertise to solve them.
5. To provide knowledge Nervous System, Immune System, and Cell Signaling

REFERENCES/ TEXT BOOK

1. **S. ThyagaRajan, N. Selvamurugan, M. P. Rajesh, R. A. Nazeer, Richard W. Thilagaraj, S. Barathi, and M. K. Jaganathan,** "Biology for Engineers," Tata McGraw-Hill, New Delhi, 2012.
2. **Jeremy M. Berg, John L. Tymoczko and Lubert Stryer,** "Biochemistry," W.H. Freeman and Co. Ltd., 6th Ed., 2006.
3. **Robert Weaver,** "Molecular Biology," MCGraw-Hill, 5th Edition, 2012.
4. **Jon Cooper**, "Biosensors A Practical Approach" Bellwether Books, 2004.
5. **Martin Alexander,** "Biodegradation and Bioremediation," Academic Press, 1994.
6. **Kenneth Murphy**, "Janeway's Immunobiology," Garland Science; 8th edition, 2011.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Course Title: Electrical Machine Lab. **Max. Marks: 50**
Course Code: PCC-EE–531 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of the laboratory is to equip the students with the exposure to the working operation and characteristics of the A.C. Machines.

List of Experiments:

1. To obtain equivalent circuit, efficiency and voltage regulation of a single-phase transformer using O.C. and S.C. tests.
2. To study three-phase transformer connection (a) Star-star (b)Star-delta (c) delta-star (d)delta-delta
3. To obtain magnetization characteristics of a d.c. shunt generator.
4. To obtain speed-torque characteristics of a dc shunt motor.
5. To obtain speed control of dc shunt motor using (a) armature resistance control (b) field control.
6. To perform no load and blocked rotor tests on a three-phase squirrel cage induction motor and determine equivalent circuit.
7. To perform no load and blocked rotor tests on a single-phase induction motor and determine equivalent circuit.
8. To study speed control of three phase induction motor by varying supply voltage.
9. To determine V-curves and inverted V-curves of a three-phase synchronous motor.
10. To study speed control of switched reluctance motor.
11. To study speed control of BLDC Motor.

Laboratory Outcome:

At the end of this laboratory the

CO1. Get an exposure to common electrical machines and their ratings.
CO2. Understand the basic characteristics of single-phase / three-phase transformers.
CO3. Understand the basic characteristics of various A.C/ DC machines.
CO4. Student will be able to control speed of AC/DC machine with different means.
CO5. Understand various speed control methods of special machines.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Applied Electronics Lab. **Max. Marks: 50**
Course Code: PCC-EE-532 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The student will be able to understand the functionality and characteristics of different types of Electronics devices.

List of Experiments:

1. To study bipolar transistor as a switch.
2. To plot a load line for a CE amplifier and show effect of input signal on Q-point.
3. To demonstrate use of a BJT in a CE amplifier circuit configuration and study its frequency response.
4. To study the characteristics of Class- AB amplifier.
5. To study the characteristics of Class- B push-pull amplifier.
6. Study of OP AMPs – IC 841, IC 555, – Functioning, Parameters and Specifications.
7. To demonstrate the relationship between input and output for the inverting and non-inverting configuration of the Op-Amp 841
8. To perform the Application operation – Adder, Subtractor, Comparator Circuits using IC 841.
9. To design a square wave and triangular wave generator using Op-amp's.
10. Active Filter Applications – LPF, HPF (first order & 2^{nd} order)
11. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
12. IC 555 Timer – Monostable Operation Circuit.
13. IC 555 Timer – Astable Operation Circuit.
14. Schmitt Trigger Circuits – using IC 841 and IC 555.

Laboratory Outcome:

The students should be

CO1. Able to devise simple circuit using BJTs, Op-Amp etc.
CO2. Able to understand characteristics of different electronics devices.
CO3. Able to perform different operations on devices.
CO4. Able to understand the applications of different types of filters and timer.
CO5. Able to finds many performance indices in the circuit.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Industrial Training-I **Max. Marks: 50**
Course Code: PROJ-EE-531 **University Exam: 0**
Internal Assessment: 50
Credits: 1 [0-0-0]

Course Title: Seminar **Max. Marks: 100**
Course Code: PROJ-EE-532 **University Exam: 0**
Internal Assessment: 100
Credits: 2 [0-0-0]

Semester VI

Course Title: Power Electronics **Max. Marks: 100**
Course Code: PCC-EE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to have knowledge of basic concepts of power electronics devices and their operational and performance characteristics, along with converters.

Detailed Contents:

Unit I

Power Semiconductor Devices & their Characteristics: Application of power electronics, classification of power semiconductor devices, ideal switch, power diodes & thyristor with characteristics, two transistor model of thyristor, di/dt, dv/dt limitations and snubber circuits, other power semiconductor devices (DIAC, TRIAC, IGBT, MOSFET) with their characteristics.

Unit II

AC to DC Converters: Types of AC to DC converters, single phase half-wave and full-wave controlled rectifiers with resistive load, inductive load and freewheeling diode, detailed derivation of RMS, average value, harmonic factor, displacement factor, THD, crest factor. Introduction to three phase full and semi controlled rectifiers, dual converters.

Unit III

DC to DC Converters: Principle of chopper, control techniques of chopper (TRC and CLC), switching regulators: Buck, Boost, Buck-Boost, basic principles of SMPS and UPS, Introduction to resonant converters.

Unit IV

DC to AC Converters: Voltage-driven inverter, current-driven inverter, Single-phase inverter with resistive load, inductive load, Sinusoidal PWM Inverter, Introduction to resonant inverters, three phase inverter, 120–180-degree conduction.

Unit V

AC to AC Converters: AC Voltage Controllers: Single and three phase AC voltage controllers. Cycloconverters: Single phase to single-phase, three-phase to single-phase, three-phase to three-phase cycloconverter circuit and their operation.

Course Outcome:

At the end of the course the students will be able to

CO1. Articulate the basics of power electronic devices and characteristics of SCR, DIAC, TRIAC, MOSFET and IGBT.

CO2. Express the design and control of converters.

CO3. Design of power electronic converters in power control applications.

CO4. Ability to design AC voltage controller, Chopper circuit, Inverter circuit and Cyclo-Converter.

CO5. Analyze the operation of DC-DC choppers and voltage source inverters.

Text Books/References:

1. **M. H. Rashid**, "Power electronics: circuits, devices, and applications", Pearson Education India, 2009.
2. **N. Mohan and T. M. Undeland**, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
3. **R. W. Erickson and D. Maksimovic**, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
4. **L. Umanand**, "Power Electronics: Essentials and Applications", Wiley India, 2009.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting one from each unit.

Course Title: Power System-II **Max. Marks: 100**
Course Code: PCC-EE-622 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: This subject familiarizes a student with the power system behavior and performance during normal and abnormal conditions.

Detailed Contents:

Unit-I

Per unit Representation, one line diagram and impedance diagram. Turbines and Speed-Governors, Frequency dependence of loads, Droop Control and Power Sharing. Automatic Generation Control.

Unit-II

Symmetrical components of a three phase system, Evaluation of components, Three-phase power in terms of symmetrical components, Sequence impedances. Sequence network. Calculation of fault currents for unsymmetrical faults: Single Line to Ground, Line-to-Line, Double Line to Ground faults and for symmetrical 3-phase balanced faults,

Unit-III

Load flow analysis: Introduction, Bus classifications, Nodal admittance matrix (YBUS), Development of load flow equations. Load flow solution using Gauss-Seidel and Newton Raphson method, Approximation to N-R method. Calculation of line flows and line losses.

Unit-IV

Power System Stability, Transient and Steady State stability, Power Angle Equation, Swing Equation, Equal Area Criterion of Stability, Critical clearing angle, Factors affecting transient stability. Active and Reactive power control.

Unit-V

Travelling waves on transmission lines: Reflection and refraction coefficient, open-end line, Short-circuited line, Line terminated through impedance. Line terminated through cable, Surge Impedance loading, Bewley Lattice Diagrams.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the importance of Per unit representation in Power System

CO2. Understand various faults in Power System

CO3. Understand methods for Load Flow analysis

CO4. Understand the importance of Power System Stability

CO5. Understand the phenomenon of Travelling Waves on transmission lines

Text Books/References:

1. **J. Grainger and W. D. Stevenson**, "Power System Analysis", McGraw Hill Education, 1994.
2. **O. I. Elgerd**, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
3. **A. R. Bergen and V. Vittal**, "Power System Analysis", Pearson Education Inc., 1999.

4. **D. P. Kothari and I. J. Nagrath**, "Modern Power System Analysis", McGraw Hill Education, 2003.
5. **B. M. Weedy,B. J. Cory, N. Jenkins**, J. Ekanayake and G. Strbac, "Electric Power Systems", Wiley, 2012.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Electrical Measurement-II **Max. Marks: 100**
Course Code: PCC-EE-623 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Detailed contents:

Unit-I

Potentiometers: Introduction, DC potentiometer-principle of operation, standardization of potentiometer, Crompton's & Duo range potentiometer, Applications of DC Potentiometer.

AC Potentiometer: Polar type & Co-ordinate type AC potentiometers, application of AC Potentiometers in electrical measurement

Unit-II

Transducers: Principe of operation, classification of transducers, Summary of factors influencing the choice of transducer. Qualitative treatment of Strain Gauge, Linear Variable Differential Transformer (LVDT), Thermocouple, Piezoelectric crystal & photoelectric transducers

Unit-III

Phase & Frequency Measurement: Frequency meters – vibrating reed type, electrical resonance type & Weston type frequency meters, Digital frequency meter, Analog & digital phase meters & their comparison.

Unit-IV

Digital Instruments: Digital Voltmeters – Millimeters – automation in Voltmeter – Accuracy and Resolution in DVM - Guarding techniques – Frequency counter- Data Loggers – Introduction to IEEE 488/GPIB Buses.

Unit-V

Data Display & Recording Systems: Introduction to cathode ray tube, block Diagram of CRO. Measurement of voltage, current, phase & frequency using CRO, Dual Beam Oscilloscope, Dual Trace Oscilloscope Analog and Digital Recorders, Measurement systems applied to Micro and Nanotechnology

Course Outcome:

The fundamentals developed in this study will expose the students to a broad knowledge of experimental methods and measurement techniques. After completion of this subject the student will be able to:

CO1. Understand the principal, standardization and application of AC and DC potentiometer.

CO2. Analyze different types and applications of transducers.
CO3. Understand basic concepts of phase and frequency measurements.
CO4. Analyze digital instruments.
CO5. Analyze data recording systems.

Text Books/References:

1. **Albert D.Helfrick and William D. Cooper**, "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2007.
2. **Ernest o Doebelin and dhanesh N manik**, "Measurement systems", 5thedition, McGraw-Hill, 2007.
3. **John P. Bentley**, "Principles of Measurement Systems", Fourth edition, pearson Education Limited, 2005.
4. **A. K. Sawhney**, "Course in Electrical and Electronic Measurement and Instrumentation", Dhanpat Rai Publisher, 2000.
5. **Bouwens,A.J**, "Digital Instrumentation", Tata Mc-Graw Hill, 1986.
6. **David A.Bell**, "Electronic Instrumentation and Measurements", Second edition,Prentice Hall of India, 2007.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting one from each unit.

Course Title: Control System **Max. Marks: 100**
Course Code: PCC-EE-624 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 4 [3-1-0]

Course Objective: The course puts an emphasis on the basics of control systems and Controller Design.

Detailed Contents:

Unit-I

Introduction to control problem: Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra.

Unit-II

Time Response Analysis: Standard test signals. Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci.

Unit-III

Frequency-response analysis: Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

Unit-IV

Introduction to Controller Design: Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and Lag compensation in designs. Analog and Digital implementation of controllers.

Unit-V

State variable Analysis: Concepts of state variables. State space model. Diagonalization of State Matrix. Solution of state equations. Eigenvalues and Stability Analysis. Concept of controllability and observability.

Pole-placement by state feedback. Discrete-time systems. Difference Equations. State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the basics of control systems.

CO2. Understand the modeling of linear-time-invariant systems using transfer function.
CO3. Know the frequency response for stability analysis.
CO4. Design the controller.
CO5. Perform state-space representations for stability, controllability and observability.

Text Books/References:

1. **M. Gopal**, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
2. **B. C. Kuo**, "Automatic Control System", Prentice Hall, 1995.
3. **K. Ogata**, "Modern Control Engineering", Prentice Hall, 1991.
4. **I. J. Nagrath and M. Gopal**, "Control Systems Engineering", New Age International, 2009

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Professional Elective courses-I **Max. Marks: 100**
Course Code: PEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Professional Elective Courses-I

Course Title: Electrical Substation Design **Max. Marks: 100**
Course Code: PEC-EE-621 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to allow the students to grasp design and operation of sub-station and bus-bar systems.

Detailed Contents:

Unit-I
Sub-Station Design: General aspects of sub-station design, Site consideration, design consideration and environmental consideration of substation, layout with all equipments.

Unit-II
Bus-Bar Design: Bus bar arrangement with detailed layout-single bus-bar arrangement, single sectionalized bus-bar scheme, main and transfer bus-bar scheme, ring bus scheme, breaker and half scheme, double bus bar arrangement, double bus and transfer bus arrangement.

Unit-III
Switch Operation: Isolating switches, location, rating, selection, operation and control. Interlocking-mechanical and electrical, rating and selection of isolators.

Unit-IV
Transformers and Circuit Breakers: Voltage & Current Transformers. Governing specifications, rating & selection requirement of CT's & PT's for different protection schemes. Standard ratings & selection. Restricting voltage & recovery voltage, particular performance & testing of circuit breaker.

Unit-V
Control & Relay panels: Design of control & relay panels. Planning of control circuit. Voltage selection scheme. General Earthing of a substation. Complete design of Earthing grid.

Course Outcome:
By the end of this course, the student should be able to:
CO1. Explain the principles of design and operation of electric Sub-Station Design
CO2. Apply analytic techniques pertaining to primary Bus-Bar Design systems.
CO3. Use basic design principles for Switch Operation and facilities.
CO4. Examine primary Transformers and Circuit Breakers systems using computer-based modeling.
CO5. Discuss computational algorithms of Control & Relay panels' system analysis and operation.

Text Books/ References:

1. **P.S Satnam**, Substation Design.
2. **P.V Gupta**, Substation Design and Equipments. DhanpatRai Publications.
3. **John D. McDonald**Electric Power Substations Engineering, Third Edition, May 16, 2012.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Energy Audit and Management **Max. Marks: 100**
Course Code: PEC-EE-622 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course gives an overview of various aspects of conservation, management& audit of electrical energy.

Detailed Contents:

Unit-I

Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, longterm energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energystrategy for the future, air pollution, climate change. Energy Conservation, Energy Conservation Act and its features.

Unit-II

Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

Unit-III

Energy Efficiency in Electrical Systems: Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

Unit-IV

Energy Efficiency in Industrial Systems: Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacityassessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fansand blowers: Types, performance evaluation, efficient system operation, Pumps and Pumping System: Types, performance evaluation, efficient system operation.
Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling

Unit-V

Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lightingcontrols, energy saving potential of each technology.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the current energy scenario and realize the need for new reforms to efficientlymanage the energy resources.

CO2. Learn various auditing techniques used for proper energy management.

CO3. Realize how energy conservation could be done in Electrical Systems by managing theenergy losses and malpractices.

CO4. Realize how energy conservation could be done in Industrial Systems by finding out thefactor affecting the performance of various industrial devices and mitigating the same.

CO5. How electrical energy management could be achieved using new energy efficient devices.

Text Books/Reference:

1. Guide books for National Certification Examination for Energy Manager / Energy AuditorsBook-1, General Aspects (available online)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online)
3. S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.
4. Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will beset from each unit. The student has to attempt five questions at least one from each uni

Course Title: Power Engineering **Max. Marks: 100**
Course Code: PEC-EE-623 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to allow the students to grasp various methods of power generation, tariff calculations.

Detailed contents

Unit-1

Economic Aspects and Power Factor Improvement: Economics of generation, factors affecting the cost of generation, reduction of costs by interconnection of stations, curves useful in system operation, choice of size and number of generating units. Power factor disadvantages of low power factor, methods of improving power factor, location of power factor improvement apparatus, economics of power factor improvement.

Unit-II

Power Tariff: Cost of generating station, fixed capital, running capital annual cost running charges, fixed charges, methods of depreciation, factors influencing the rate of tariff, designing tariff, different types of tariff, flat rate tariff, block rate tariff, two part tariff maximum demand tariff, power factor tariff.

Unit-III

Thermal and Nuclear Power Plants: General layout, choice of site, super heater, air pre heater, economizer, coal handling plant, cooling towers, electrostatic precipitator, advantage and disadvantages. Introduction to nuclear energy, choice of site of the plant, advantages and disadvantages, main components of the plant and type of reactors.
Introduction to Diesel power stations and gas turbine plants.

Unit-IV

Hydroelectric power plants: Hydrology, load flow duration curve, hydro graph, mass curve, choice of site of the plant, advantages and disadvantages of the plant, layout of the plant, classification of the hydroelectric plant, introduction to mini & micro hydro.

Unit-V

Substations and Grounding: Neutral grounding, solid grounding resistance grounding, reactance grounding, are suppression coil grounding Earthing transformers, choice of methods of neutral grounding equipment, grounding for safety. Introduction to substations and substation equipment.

Course outcomes

This subject exposes. After the completion of this course student will be able to:

CO1. Understand economic aspects of power generation, transmission & transmission along with the advantages of power factor improvement.

CO2. Analyze different costs associated with power systems and ways to reduce it analyze various tariffs schemes.

CO3. Understand the layout and design considerations of thermal and nuclear plants.

CO4. Understand the layout and design considerations of hydroelectric plants.

CO5. Understand various types of substation groundings.

Text Books/Reference:

1. **Deshpande M.V**., Elements of power station design, TMH.
2. **H. Pratab**, The art and Science of Utilisation of Electric energy, PHI.
3. **Satnam**, Substation Design and Equipment.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Industrial Electrical Systems **Max. Marks: 100**
Course Code: PEC-EE-624 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The course will give the fundamental knowledge about the Industrial Electrical Systems.

Detailed Contents

Unit-I

Electrical System Components: LT system wiring components, selection of cables, wires, switches, distribution box, metering system, Tariff structure, protection components- Fuse, MCB, MCCB, ELCB, inverse current characteristics, symbols, single line diagram (SLD) of a wiring system, Contactor, Isolator, Relays, MPCB, Electric shock and Electrical safety practices

Unit-II

Residential and Commercial Electrical Systems: Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, Earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, Earthing of commercial installation, selection and sizing of components.

Unit-III

Illumination Systems: Understanding various terms regarding light, lumen, intensity, candle power, lamp efficiency, specific consumption, glare, space to height ratio, waste light factor, depreciation factor, various illumination schemes, Incandescent lamps and modern luminaries like CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for a residential and commercial premises, flood lighting.

Unit-IV

Industrial Electrical Systems I: HT connection, industrial substation, Transformer selection, Industrial loads, motors, starting of motors, SLD, Cable and Switchgear selection, Lightning Protection, Earthing design, Power factor correction – kVAR calculations, type of compensation, Introduction to PCC, MCC panels. Specifications of LT Breakers, MCB and other LT panel components.

Unit-V

Industrial Electrical System Automation: Study of basic PLC, Role of in automation, advantages of process automation, PLC based control system design, Panel Metering and Introduction to SCADA system for distribution automation.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

CO1. Understand various components of industrial electrical systems.

CO2. Understand the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.

CO3. Understand illumination and various deign scheme for energy systems.

CO4. Analyze and select the proper size of various electrical system components.

CO5. Study the basics of PLCC and SCADA systems.

Text/Reference Books

1. **S. L. Uppal and G. C. Garg**, "Electrical Wiring, Estimating &Costing", Khanna publishers, 2008.
2. **K. B. Raina**, "Electrical Design, Estimating & Costing", New age International, 2007.
3. **S. Singh and R. D. Singh**, "Electrical estimating and costing", Dhanpat Rai and Co., 1997.
4. Web site for IS Standards.
5. **H. Joshi**, "Residential Commercial and Industrial Systems", McGraw Hill Education, 2008.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Computers in medicine **Max. Marks: 100**
Course Code: PEC-EE-625 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: Objective of this course is to get students aware with the importance and application of Computers in medicine.

Detailed Contents:

Unit-I

Introduction: Structure of Medical Informatics, Internet and Medicine, Security issues, Computer based medical information retrieval, Hospital management and information system, Functional capabilities of a computerized HIS, e-health services, Health Informatics, Medical Informatics, Bioinformatics.

Unit-II

Computerized Patient Record: History taking by computer, Dialogue with the computer, Components and functionality of CPR, Development tools, Intranet, CPR in Radiology, Application server provider, Clinical information system, Computerized prescriptions for patients.

Unit-III

Computers in Clinical Laboratory and Medical Imagining: Automated clinical laboratories-Automated methods in hematology, cytology and histology, Intelligent Laboratory Information System, Computerized ECG, EEG and EMG, Computer assisted medical imaging- nuclear medicine, ultrasound imaging ultrasonography-computed X-ray tomography, Radiation therapy and planning, Nuclear Magnetic Resonance

Unit-IV

Computer Assisted Medical Decision-Making: Neuro-computers and Artificial Neural Networks application, Expert system, General model of CMD, Computer-assisted decision support system, production rule, system cognitive model, semester networks , decisions analysis in clinical medicine, computers in the care of critically patients, computer assisted surgery, designing.

Unit-V

Recent Trends in Medical Informatics: Virtual reality applications in medicine, Computer assisted surgery, surgical simulation, Telemedicine, Tele surgery computer aids for the handicapped, computer assisted instrumentation in Medical Informatics, Computer assisted patient education and health, Medical education and health care information.

Course Outcome:

After completing subject, Students will be able to

CO1. Understand the informatics related to hospital management and security concerns.

CO2. Understand the importance of Computerized Patient Record.

CO3. Understand the importance of computers in Clinical Laboratory and Medical Imagining.

CO4. Aware with the Recent Trends in Medical Informatics.

Text Books /References:

1. R.D. Lele Computers in medicine progress in medical informatics, Tata Mcgraw Hill Publishing computers Ltd, 2005, New Delhi.
2. Mohan Bansal, Medical informatics Tata Mcgraw Hill Publishing computers Ltd, 2003, New Delhi.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Power System Lab. **Max. Marks: 50**
Course Code: PCC-EE-631 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of performing this laboratory course is to give broader idea about power system transmission and distribution.

List of Experiments:

1. To study the various types of components used in power transmission and distribution line.
2. To determine voltage distribution and string efficiency of string insulator with and without guard ring method.
3. To study the Ferranti effect of Long Transmission Line model.
4. Determination of the ABCD of short transmission line.
5. Determine the ABCD of medium transmission line for π network.
6. Determine the ABCD of medium transmission line for T network.
7. Determine the ABCD of long transmission line.
8. To locate fault in a cable by Murray Loop Test.
9. Measurement of power and power factor in a single-phase AC circuit and improvement of Power factor using capacitor.

Laboratory Outcome:

Students will

CO1. Get an exposure to common power system equipment's and components used in transmission line

CO2. Understand the need of compensation in Transmission lines

CO3. Understand the relation between I/p voltage and current with O/p voltage and current

CO4. Understand how to detect fault in underground cables.

CO5. Understand need of power factor improvement in power system.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Electrical Measurements Lab. **Max. Marks: 50**
Course Code: PCC-EE-632 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of performing this laboratory is to provide knowledge about various types of bridge and transducer for practical problems.

List of Experiments:

1. To measure frequency and phase of a signal from a Lissajous Pattern using CRO.
2. Measurement of Inductance by Maxwell's Bridge.
3. Measurement of small resistance by Kelvin's Bridge.
4. Measurement of Capacitance by Schering Bridge.
5. Measurement of medium resistance by Wheat Stone's Bridge.
6. To measure a Strain using a Strain Gauge Transducer.
7. To measure a Displacement using LVDT Transducer.
8. To measure a Temperature using Thermocouple Transducer.
9. To measure a Temperature using Thermistor Transducer.

Laboratory Outcome:

Students will

CO1. Get an exposure to common electrical and electronic measurements instruments systems and their ratings.

CO2. Able to measure frequency and phase of signal using CRO.

CO3. Understand the basic characteristics of various bridges to know the different network parameter.

CO4. Understand the usage of different type of transducers.

CO5. Able to measure different quantities using transducers.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Control system Lab. **Max. Marks: 50**
Course Code: PCC-EE-633 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of this laboratory is to understand different control scheme.

List of Experiments:

1. To study the performance of Relay control Combination of P,I and D control schemes in a typical thermal system.(oven)
2. To study the torque-speed characteristics of an AC servomotor.
3. To study the time response of a variety of simulated linear systems.
4. To study the role of feedback in a DC speed control system.
5. To study the role of feedback in a DC position control system.
6. To study the role of a combination of P, I and D control actions in a variety of simulated linear systems.
7. To study the computer simulation of a number of systems.
8. Use of MATLAB / SIMULINK /Control System tool boxes.

Laboratory Outcome:

The students should know about various control systems and able to

CO1. Analysis various open loop and close loop control systems.
CO2. Understand performance characteristics of servo motors.
CO3. Check the response of various performance indices of various controllers used in the digital control system.
CO4. Able to understand DC speed and position control.
CO5. Learn about MATLAB Simulink.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester VII

Course Title: Power System Protection **Max. Marks: 100**
Course Code: PCC-EE-721 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course makes the student familiar with various types of protection schemes &equipment's used for protection of electrical power system.

Detailed Contents:

Unit-I

Relays: Function of protective relaying, fundamental principles, primary and backup relaying, functional characteristics. Operating principles and characteristics of the following electromechanical relays: Current, voltage, directional, current balance, voltage balance, differential relays, and distance relays.

Unit-II

Protection of Generators &Transformers: Short-circuit protection of stator windings, Overheating protection, Overvoltage protection, Protection against vibration, protection against motoring over speed.

Short circuit protection, over current and earth-fault protection differential protection. Use of biased relay for differential protection, self-balance system protection, differential magnetic balance protection, Buchholz relay, protection of parallel transformer banks.

Unit-III

Protection of Feeders, Bus-bars and Transmission Lines: Protection of feeders, time limit fuse, over current protection for radial feeders, protection of parallel feeders, differential protection for parallel feeders, differential pilot wire protection, Circulating current protection, protection for bus-bars.

Unit-IV

Fuses: Fusing element, classification of fuses, current carrying capacity of fuses, high rupturing capacity (H.R.C.) cartridge fuses, characteristics of H.R.C. fuses, selection of HRC fuses. MCBs. Types of MCBs.

Unit-V

Circuit Breaker: Types of circuit breakers, basic principle of operation, phenomena of arc, initiation of a arc, maintenance of arc, arc extinction, d.c. circuit breaking, a.c. circuit breaking, arc voltage and current waveforms in a.c. circuit breaking, restricting and recovery voltages, de-ionization and current chopping, ratings of circuit breakers, oil circuit breakers, air blast circuit breakers, SF6 Circuit breakers, Vacuum breakers.

Course Outcome:
This course will enable student to:

CO1. Understand the importance of various types of relays.
CO2. Understand the protection scheme for generators and transformers.
CO3. Understand the protection scheme of feeder, bus-bar and transmission lines.
CO4. Understand the concept and use of fuses.
CO5. Understand the use of circuit breaker in protection schemes of various power system equipments.

Text Books/References:

1. **C.R Mason**, The Art and Science of Protective Relaying, John Wiley & Sons
2. **Badri Ram,** Power System Protection and switchgear, TMH
3. **J. L Black. Burn**, Protective relaying, Principles and Applications.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Electrical Drives **Max. Marks: 100**
Course Code: PCC-EE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The Objectives to introduce the basic concepts of DC electric drives and AC electric drives and their closed-loop operation including microprocessor-based arrangements.

Detailed contents:

Unit-I

Types of Drives and Load: Introduction, advantages of electric drives, components of electric drives, modes of operation, characteristic of different types of mechanical load, steady state stability of motor load system, fluctuating loads and load equalization, thermal loading of motor, estimation of motor rating for continuous, intermittent, and short time duty loads.

Unit-II

DC Drives I: Characteristics of DC motors. Conventional methods of speed control: rheostatic, field and armature control. Electric braking of DC drives: Regenerative braking, Plugging and dynamic braking. Phase control of fully controlled DC drives, continuous and discontinuous conduction modes of operation.

Unit-III

DC Drives II: Chopper controlled drives. Comparison of phase and chopper controlled drives. Review of feedback control, closed loop configurations in electric drives: current limit control, torque control, speed control of multi-motor drives and position control. Closed loop control of phase and chopper-controlled dc drives.

Unit-IV

AC Drives I: Review of three phase induction motor characteristics. Electric braking of induction motor drives: Regenerative, Plugging, AC and DC dynamic braking. Methods of speed control of induction motors: stator voltage control, variable frequency control, and pole changing and pole amplitude modulation.

Unit-V

AC Drives II: Speed control of wound rotor induction motor: rotor resistance control (conventional and static), slip power recovery schemes. Closed loop control of induction motor drives: VSI control, static rotor resistance control, static Scherbius and Kramer drives, current regulated VSI drives. Introduction to vector control.

Course Outcome:

At the end of the course the students will be able to

CO1. Apply the knowledge of drives and use them effectively.

CO2. Able to control the speed of DC motor and Induction motor.

CO3. Able to realize different braking methods in AC/ DC drive.

CO4. Suggest the particular type of AC/DC drive system for an application.

CO5. To apply close loop control in AC/DC Drive.

Text Books/References:

1. **G. K. Dubey**, Fundamentals of Electric Drives, Narosa Publications, New Delhi.
2. **B. K. Bose**, Power Electronics and variable frequency drives, PHI.
3. **R. Krishnan**, "Electric Motor Drives: Modeling, Analysis and Control", PHI.

4. **M. Ahmad**, High Performance AC Drives: Modelling, Analysis and Control, Springer.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Course Title: Microprocessors & Interfacing **Max. Marks: 100**
Course Code: PCC-EE-723 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The objective of this course is to introduce to the students the fundamental of 8085 and 8086 microprocessors and their interfacing.

Unit-I

Introduction to 8085: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

8085 Assembly Language Programming and Interrupts: Assembly language programming in 8085, Microprocessor timings, Machine cycles, T states, Timing diagram for different machine cycles. Interrupts in 8085, RST instructions, multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts

Unit-III

8085 Interfacing: Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA Controller. Interfacing of keyboard, LED and seven segment displays with 8085.

Unit-IV

8086 Microprocessor: Overview of 8086 features, architecture of 8086: execution unit and bus interface unit, flags and general purpose register, 8086 pin diagram, Memory segmentation, Minimum and Maximum mode operation, Addressing modes.

Unit-V

8086 Assembly Language Programming and Interrupts: 8086 instruction set, assembler directives, macros. Assembly language programming involving arithmetic, logical, branch & call instructions, string manipulations. 8086 interrupts.

Course Outcomes: After completion of the course student will be able to:

1. Describe the various architectural aspects of 8085 Microprocessor.
2. Understand the interrupt phenomenon, timing diagram and write basic assembly language programming in 8085
3. Elaborate the synchronous and asynchronous data transfer and Direct Memory Access in 8085 and interfacing of 8085 with external devices.
4. Describe the various architectural aspects of 8086 Microprocessor.
5. Understand the interrupt phenomenon and write basic assembly language programming in 8086

Text Books:

1. **R. S. Gaonkar**, Microprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.
2. **Douglas V Hall**, Microprocessors & Interfacing, TMH

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Course Title: Design of Electric Machines **Max Marks: 100**
Course Code: PCC-EE-724 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to make students familiar with various designing procedures involved in designing electrical machines.

Detailed Contents:

Unit-I
Introduction: Major considerations in electrical machine design, electrical engineering materials, space factor, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines.

Unit-II
Transformers: Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, operating characteristics, regulation, no load current, temperature rise in transformers, design of cooling tank, methods for cooling of transformers.

Unit-III
Induction Motors: Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, magnetic leakage calculations, leakage reactance of poly-phase machines, magnetizing current, short circuit current, circle diagram, operating characteristics.

Unit-IV
Synchronous Machines: Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding, determination of full load field mmf, design of field winding, design of turbo alternators, rotor design.

Unit-V
Computer aided Design (CAD): Limitations (assumptions) of traditional designs, need for CAD analysis, synthesis and hybrid methods, design optimization methods, variables, constraints and objective function, problem formulation. Introduction to FEM based machine design. Introduction to **c**omplex structures of modern machines-PMSMs, BLDCs, SRM and claw-pole machines.

Course Outcomes:
At the end of this course, students will demonstrate the ability to

CO1. Understand the construction and performance characteristics of electrical machines.
CO2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of Transformer.
CO3. Understand the various factors which influence the design: electrical and magnetic loading of Induction motor and synchronous machine.
CO4. Understand the principles of electrical machine design and carry out a basic design of synchronous machines.
CO5. Use software tools to do design calculations.

Text Books/References:

1. **A. K. Sawhney**, A Course in Electrical Machine Design, Dhanpat Rai Publication.
2. **V. N. Mittle**, Design of Electrical Machines, Standard Publishers Distributors.
3. **R. K. Agarwal**, Principles of Electrical machine Designs. K. Kataria & Sons
4. **S. K. Sen**, Principles of Electrical machine Design, Oxford & Ibh Publishing Co. Pvt Ltd

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Course Title: Minor Project **Max. Marks: 150**
Course Code: PROJ-EE-721 **University Exam: 0**
Internal Assessment: 150
Credits: 3 [0-0-0]

Detailed contents

At the start of VII semester every student shall be allotted a Minor Project under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project under the supervision of their allotted mentor. Students are required to complete the Minor Project during semester VII. Minor Project shall be evaluated internally as per university statutes by a committee consisting of:

1. Three Member Committee constituted by HoD
2. Coordinator(s)/Supervisor(s) of minor project/training.

Course Title: Professional Elective courses-II **Max. Marks: 100**
Course Code: PEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Professional Elective Courses-II

Course Title: Wind and Solar Energy Systems **Max. Marks: 100**
Course Code: PEC-EE-721 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to have overall knowledge about the various technologies for wind and solar power generation.

Detailed Contents:

Unit-I
Physics of Wind Power: History of wind power, Indian and Global statistics, Wind physics, Betz limit, Tip speed ratio, stall and pitch control, Wind speed statistics-probability distributions, Wind speed and power-cumulative distribution functions.
Unit-II
Wind generator topologies: Review of modern wind turbine technologies, Fixed and Variable speed wind turbines, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent-Magnet Synchronous Generators, Power electronics converters. Generator-Converter configurations, Converter Control.
Unit-III
The Solar Resource and Solar photovoltaic: Introduction, solar radiation spectra, solar geometry, Earth Sun angles, observer Sun angles, solar day length, Estimation of solar energy availability. Technologies-Amorphous, mono-crystalline, polycrystalline; V-I characteristics of a PV cell, PV Units, array, Power Electronic Converters for Solar Systems, Maximum Power Point Tracking (MPPT) algorithms. Converter Control.
Unit-IV
Network Integration Issues: Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behaviour during grid disturbances. Power quality issues. Power system interconnection experiences in the world. Hybrid and isolated operations of solar PV and wind systems.
Unit-V
Solar thermal power generation: Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.
Course Outcome:
At the end of this course, students will demonstrate the ability to
CO1. Understand the basic physics of wind.
CO2. Understand the various wind generation topologies.
CO3. Understand the sun characteristics and solar photovoltaic systems.
CO4. Understand the power electronic interfaces for wind and solar generation.
CO5. Understand concentrated solar photo voltaic technology.

Text Books/ References:

1. **T. Ackermann**, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
2. **G. M. Masters**, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.

3. **S. P. Sukhatme**, “Solar Energy: Principles of Thermal Collection and Storage”, McGraw Hill, 1984.
4. **H. Siegfried and R. Waddington**, “Grid integration of wind energy conversion systems” John Wiley and Sons Ltd., 2006.
5. **G. N. Tiwari and M. K. Ghosal**, “Renewable Energy Applications”, Narosa Publications, 2004.
6. **J. A. Duffie and W. A. Beckman**, “Solar Engineering of Thermal Processes”, John Wiley & Sons, 1991.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: EHV AC and DC Transmission **Max. Marks: 100**
Course Code: PEC-EE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to provide in-depth knowledge of various electrical aspects associated with AC & DC transmission of power at Extra High Voltages.

Detailed contents:

Unit-I

Introduction: Historical background, Component of EHV-AC transmission network. Need of EHV transmission, comparison of EHV Ac & Dc transmission, mechanical considerations of transmission line, Overview of present transmission system in India, future plan in transmission.

Unit-II

EHV AC Transmission: Parameters of EHV line, over-voltage due to switching, Ferro-resonance, line insulator and clearance, corona, long distance transmission with series & shunt. Principle of half wave transmission. Flexible ac transmission. EHV AC transmission system, transmission planning and its correlation with generation. Compensations, principle of half wave transmission flexible ac transmission.

Unit-III

EHV DC Transmission: Types of dc links, terminal equipment and their operations, HVDC system control reactive power control, harmonics, multi-terminal dc (MTDC) system, ac/dc system analysis, protection of terminal equipments.

Unit-IV

Design of EHV transmission: Transmission network, selection of operating voltage and conductor, calculation of voltage gradient, corona loss, radio interference level.

Unit-V

Control of EHV system: Basic principle of control, control implementation, converter firing control system, value blocking and by passing, stopping and power flow reversal.

Course Outcome:

This course will allow the students to:

CO1. Understand the need of EHV transmission.

CO2. Analyze different parameters of EHV AC transmission systems and study of various compensation methods.

CO3. Understand different EHVDC transmission systems and various associated protection schemes.

CO4. Study and understand the design of EHV transmission system.

CO5. Realize the need for control of EHV systems and implementing the corresponding control strategies.

Text Books/References:

1. **Rakesh Das Begmudre,** Extra High Voltage AC Transmission Engineering, Wiley Eastern Limited.
2. **Padiyar K.R.**, HVDC Power Transmission System? Wiley Eastern Limited.
3. **Kimbark E.W.**, EHV-AC and HVDC Transmission Engineering & Practice, Khanna. Publishers.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Course Title: Control System Design **Max. Marks: 100**
Course Code: PEC-EE-723 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to study and analyze the design specifications of control systems in time domain and frequency domain along with the study of design in state space model.

Detailed contents:

Unit-I
Design Specifications: Introduction to design problem and philosophy. Introduction to time domain and frequency domain design specification and its physical relevance. Effect of gain on transient and steady state response. Effect of addition of pole on system performance. Effect of addition of zero on system response.
Unit-II
Design of Classical Control System in the time domain: Introduction to compensator. Design of Lag, lead lag-lead compensator in time domain. Feedback and Feed forward compensator design. Feedback compensation. Realization of compensators.
Unit-III
Design of Classical Control System in frequency domain: Compensator design in frequency domain to improve steady state and transient response.
Feedback and Feed forward compensator design using bode diagram.
Unit-IV
Design of PID controllers: Design of P, PI, PD and PID controllers in time domain and frequency domain for first, second and third order systems. Control loop with auxiliary feedback – Feed forward control.
Unit-V
Control System Design in state space: Review of state space representation. Concept of controllability & observability, effect of pole zero cancellation on the controllability & observability of the system, pole placement design through state feedback. Ackerman's Formula for feedback gain design. Design of Observer. Reduced order observer. Separation Principle.
Course Outcome:
At the end of this course
CO1. Students will demonstrate the ability to understand various design specifications.
CO2. To understand the role of compensators in classical control system.
CO3. To study design of compensators in frequency domain using bode plot.
CO4. Design controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators).Design controllers using the state-space approach.
CO5. To understand state space design of control system.

Text Books/References:

1. **N. Nise**, "Control system engineering", John Wiley, 2000.
2. **I. J. Nagrath and M. Gopal**, "Control system engineering", Wiley, 2000.
3. **M. Gopal**, "Digital Control Engineering", Wiley Eastern, 1988.

4. **K. Ogata**, “Modern Control Engineering”, Prentice Hall, 2010.
5. **B. C. Kuo**, “Automatic Control system”, Prentice Hall, 1995.
6. **J. J. D’Azzo and C. H. Houpis**, “Linear control system analysis and design (conventional and modern)”, McGraw Hill, 1995.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Energy Economics and Planning **Max. Marks: 100**
Course Code: PEC-EE-724 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course creates awareness among students about energy economics and planning. It familiarizes students about financial performance of renewable energy systems.

Detailed contents:

Unit-I

Introduction: Basics in economics; Resources scarcity; Concept of opportunity cost; Law of demand; Derivation of demand curve; Different elastic's of demand; Theory of firm; Production function, Output maximization, cost minimization and profit maximization principles; Input demand function; Different cost concept; Supply curve; Theory of market.

Unit-II

Energy Economics: Basic concept of energy economics; Calculation of Unit cost of power generation from different sources with examples; Eco-ground rules for investment in energy sector; Payback period, NPV, IRR, and benefit-c.ost analysis with example; Overview of national energy use, energy supply and renewable energy program during different plan period.

Unit-III

Modelling of energy systems and Policies: Basic concepts of Econometrics and statistical analysis; Econometric techniques used for energy analysis and forecasting with case studies from India; Operation of computer package Basic concept of Input-output analysis; Concept of energy multiplier; Optimization and simulation methods; Energy & development.

Unit-IV

Rural energy economics: Rural economic and social development considerations; Technologies, costs and choice of technology, Demand and benefits forecasting and program development; Economics, financial analysis, and bottlenecks of various decentralized renewable energy electrification program; Analysis of models controlled by local bodies.

Unit-V

Financing of renewable energy systems: Financial performance; uncertainties and social cost-benefit analysis of renewable energy systems; financing mechanism of different renewable energy systems; case studies; renewable energy projects for reduction in CO2 emissions.

Course Outcome:

At the end of this course, students will be able to:

CO1. Understand the law of demand subject to resource scarcity.

CO2. Basic concepts of Energy economics subject to eco ground rules.

CO3. Understand the econometric forecasting of energy resources.

CO4. Analyze economics sector of rural area.

CO5. Analyze financing performance of non-conventional energy systems.

Text Books/References:

1. **M. Munasinghe and P. Meier** (1993): Energy Policy Analysis and Modeling, Cambridge University Press.
2. **Dixon, et ai, Economic Analysis of Environmental Impacts**, Eartscan Publications Ltd., London,.
3. **T.E. Kandpal, H. P. Garg, Rnancial** Evaluation of Renewable Energy Technology,

Macmilan India Ltd. New Delhi, 4003.
4. **White J. A**., et.aI. Principles of Engineering of Economic Analysis, John Wiley and Sons. Inc. 1989.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Course Title: Restructuring of Power System **Max. Marks: 100**
Course Code: PEC-EE-725 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course is to allow the students to understand fundamental concepts of deregulated systems. This course also allows students to study deregulated models across the globe along with the cost mechanisms of transmitting power.

Detailed Contents:

Unit-I

Introduction: Basic concept and definitions, privatization, restructuring, transmission open access, wheeling, deregulation, components of deregulated system, advantages of competitive system.

Unit-II

Power System Restructuring: An overview of the restructured power system, difference between integrated power system and restructured power system. Explanation with suitable practical examples. Restructuring reforms in India etc.

Unit-III

Deregulation of Power Sector: Separation of ownership and operation, Deregulated models, pool model, pool and bilateral trades model, multilateral trade model. Risk Analysis and Hedging.

Unit-IV

Competitive electricity market: Independent System Operator activities in pool market, wholesale electricity market characteristics, central auction, single auction power pool, double auction power pool, market clearing and pricing, Market Power and its Mitigation Techniques, Bilateral trading, Ancillary services.

Unit-V

Transmission Pricing: Marginal pricing of Electricity, nodal pricing, zonal pricing, embedded cost, postage stamp method, contract path method, boundary flow method, MW-mile method, MVA-mile method, comparison of different methods.

Course Outcome:

The restructuring and deregulation of the power utility industry is resulting in significant competitive, technological and regulatory changes. Independent power producers, power marketers and brokers have added a new and significant dimension to the task of maintaining a reliable electric system. This course been made to get students familiar with new ways of restructuring of power system. This course will enable student to:

CO1. Basic concept of deregulated system.

CO2. Differences between regulated and deregulated system.

CO3. Study various deregulated models present worldwide.

CO4. How demand and supply bids are auctioned.

CO5. Study various transmission pricing mechanisms.

Text Books/References:

1. **Loi Lei Lai**, Power System Restructuring and Deregulation, John Wiley & Sons. Ltd.
2. **Lorrin Philipson and H. Lee Wilis**, Understanding Electric Marcel Dekker Inc, New York Utilities and Deregulation.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Course Title: Power System Protection Lab. **Max. Marks: 50**
Course Code: PCC-EE-731 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The laboratory will give the overall idea about the protection scheme involve in power systems.

List of Experiments:

1. Study of various types of relays.
2. Characteristics of different relays, Directional over current relay
3. Characteristics of inverse time over current relays, under voltage relay.
4. Time graded protection using inverse time O/C relays
5. Study of circuit breakers.
6. Study of differential protection scheme. Percentage biased deferential relay.
7. Study of an oil circuit breaker.
8. Experiment on Digital Protection. Microprocessor based over voltage/ under voltage relay.

Laboratory Outcome:
Student will able

CO1. Get an exposure to different types of protecting relays.
CO2. Understand the basic characteristics of Time graded protection system.
CO3. Understand the usage of different type of circuit breaker.
CO4. To understand digital protection.
CO5. To understand microprocessor based over voltage/ under voltage relay.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Power Electronics and Drives Lab. **Max. Marks: 50**
Course Code: PCC-EE-732 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of this laboratory is to equip student with various characteristics of power electronics drives.

List of Experiments:

1. To study R, RC and UJT triggering firing circuit for SCR.
2. To obtain SCR, MOSFET, IGBT and BJT characteristics.
3. To perform AC phase control using SCR.
4. To perform full wave AC phase control using TRIAC.
5. To analyze the performance of Cyclo-Converter.
6. Speed control of DC motor using IGBT voltage source Inverter.
7. V/f control of 3-phase induction motor using V/f controller.
8. V/f control of 3-phase induction motor using IGBT voltage source Inverter.
9. Speed control of BLDC motor using IGBT voltage source Inverter.
10. Speed control of Switched Reluctance motor using IGBT voltage source Inverter.
11. Speed control of Multiphase Inverter Drive.

Laboratory Outcome:

At the end of the laboratory the students will be able to

1. Obtain the characteristics of SCR, TRIAC, MOSFET and IGBT.
2. Implement the phase-controlled switching using TRIAC.
3. To realize different type of triggering circuits for application.
4. Control the speed of DC and BLDC motor.
5. V/F control of induction motor drives.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Course Title: Microprocessor & Interfacing Lab. **Max. Marks: 50**
Course Code: PCC-EE-733 **University Exam: 25**
Duration of Exam: 2 Hours **Internal Assessment: 25**
Credits: 1 [0-0-2]

Laboratory Objective: The objective of this laboratory is to Understand and apply various operations using assembly level programming on microprocessors.

List of Experiments

1. Study of 8085 and 8086 Microprocessor Kit.
2. Write a program to add and subtract two 8-bit and 16-bit number using 8085.
3. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8085.
4. Write a program to generate Fibonacci series using 8085.
5. Write a program to sort series using bubble sort algorithm using 8085.
6. To find the largest signed number in a given series of data using 8085.
7. To copy a block of data from one memory to another using 8085.
8. Write a program to add and subtract two 8-bit and 16-bit number using 8086.
9. Write a program to multiply two 8 bit numbers by repetitive addition and rotation method using 8086.
10. Write a program to generate Fibonacci series using 8086.
11. Write a program to sort series using bubble sort algorithm using 8086.
12. To find the largest signed number in a given series of data using 8086.
13. To copy a block of data from one memory to another using 8086.

Course Outcomes:

After completion of the course student will be able to:

1. Understand the various features of 8085 and 8086 microprocessor kits.
2. Write various arithmetic and logical based assembly language programs in 8085 and 8086.
3. Write various string manipulation based assembly language programs in 8085 and 8086.
4. Write basic data transfer programs using 8085 and 8086.
5. Function effectively as a team.

Note: This is only the suggested list of practical. Instructor may add or change some practical relevant to the course contents.

Course Title: Industrial Training-II **Max. Marks: 50**
Course Code: PROJ-EE-731 **University Exam: 0**
Internal Assessment: 50
Credits: 1 [0-0-0]

Semester VIII

Course Title: Entrepreneurship Development & Management **Max. Marks: 100**
Course Code: PCC-EE-821 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: Course is designed to acquaint the students with the skills required to become entrepreneurs and to create an awareness of the need for systematic management of projects.

Detailed Contents:

Unit-I

Entrepreneurship Development: Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centre's and other supporting agencies.

Unit-III

Project Report Preparation: Identifying business opportunities, Project report and its importance, various contents of project report: managerial and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

Unit-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, pricing strategies, Channel strategies and Promotional strategies.
Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

Unit-V

Introduction To Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation.
Introduction to Financial Management: source of finance and Working Capital management.

Course Outcome:

After completion of this subject student will be able to:

CO1. Understand the meaning, objectives and types of entrepreneurs.
CO2. Understand the Entrepreneurship Support System.
CO3. Prepare to Project Report.

CO4. Analyze business opportunities, technical feasibility and financial viability in context to entrepreneurship.

CO5. Plan the business.

Text Books/References:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1998).
3. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
4. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).
5. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit

Course Title: Major Project **Max. Marks: 500**
Course Code: PROJ-EE–821 **University Exam: 200**
Internal Assessment: 300
Credits: 9 [0-0-0]

After the university Exam of semester VII every student shall be allotted a Major Project pertaining to his/her stream under the supervision of an allotted mentor. Students are required to report in their respective departments to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project under the supervision of an allotted mentor. Students are required to complete the Major Project during semester VIII. Depending upon the infrastructure, Computing and other laboratories facilities the students shall be offered in house project on campus are they can complete their project work in any organization/industry outside the campus. Major Project shall be evaluated internally as well as externally as per university statues.

Course Title: Professional Elective courses-III **Max. Marks: 100**
Course Code: PEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Title: Professional Elective courses-IV **Max. Marks: 100**
Course Code: PEC-EE-(---) **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Professional Elective Course–III & IV

Course Title: Electrical and Hybrid Vehicles **Max. Marks: 100**
Course Code: PEC-EE-821 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The main objective of this course is to equip students with the knowledge of Electrical Hybrid Vehicles, their requirement with respect to changing energy needs.

Detailed Contents:

Unit-I

Introduction: Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical models to describe vehicle performance.

Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

Unit-II

Electric Trains: Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion Unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Unit-III

Energy Storage: Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems.

Unit-IV

Energy Management Strategies: Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy

management strategies, comparison of different energy management strategies, implementation issues of energy management strategies.

Unit-V

Case Studies: Design of a Hybrid Electric Vehicle (HEV), Design of a Battery Electric Vehicle (BEV).

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the models to describe hybrid vehicles and their performance.
CO2. Understand the suitability of particular drive for electrical traction.
CO3. Understand the different possible ways of energy storage.
CO4. Understand the different strategies related to energy storage systems.
CO5. Analyze various implemented case studies across globe.

Text Books/ References:

1. **C. Mi, M. A. Masrur and D. W. Gao**, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.
2. **S. Onori, L. Serrao and G. Rizzoni**, "Hybrid Electric Vehicles: Energy Management Strategies", Springer, 2015.
3. **M. Ehsani, Y. Gao, S. E. Gay and A. Emadi**, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.
4. **T. Denton**, "Electric and Hybrid Vehicles", Routledge, 2016.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Power Quality and FACTS **Max. Marks: 100**
Course Code: PEC-EE-822 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course to equip students with power quality issues and their mitigation along the use of FACT devices.

Detailed Contents:

Unit-I

Power Quality Problems in Distribution Systems: Power Quality problems in distribution systems: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions, Wave-form Distortions: harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement. Tolerance of Equipment: CBEMA curve.

Unit-II

Thyristor-based Flexible AC Transmission Controllers (FACTS): Description and Characteristics of Thyristor-based FACTS devices: Static VAR Compensator (SVC), Thyristor Controlled Series Capacitor (TCSC), Thyristor Controlled Braking Resistor and Single Pole Single Throw (SPST) Switch. Configurations/Modes of Operation, Harmonics and control of SVC and TCSC. Fault Current Limiter.

Unit-III

Voltage Source Converter based (FACTS) controllers: Voltage Source Converters (VSC): Six Pulse VSC, Multi-pulse and Multi-level Converters, Pulse-Width Modulation for VSCs. Selective Harmonic Elimination, Sinusoidal PWM and Space Vector Modulation. STATCOM: Principle of Operation, Reactive Power Control: Type I and Type II controllers, Static Synchronous Series Compensator (SSSC) and Unified Power Flow Controller (UPFC): Principle of Operation and Control. Working principle of Inter-phase Power Flow Controller. Other Devices: GTO Controlled Series Compensator. Fault Current Limiter.

Unit-IV

Application of FACTS: Application of FACTS devices for power-flow control and stability improvement. Simulation example of power swing damping in a single-machine infinite bus system using a TCSC. Simulation example of voltage regulation of transmission mid-point voltage using aSTATCOM.

Unit-V

DSTATCOM: Reactive Power Compensation, Harmonics and Unbalance mitigation in Distribution Systems using DSTATCOM and Shunt Active Filters. Synchronous Reference Frame Extraction of Reference Currents. Current Control Techniques in for DSTATCOM.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1. Understand the basic concepts of power quality.

CO2. Understand the characteristics of ac transmission and the effect of shunt and series reactive compensation.

CO3. Understand working of various VSC.

CO4. Study the applications of FACTs.

CO5. Understand the working of DSTATCOM along with its control.

Text Books/References:

1. **N. G. Hingorani and L. Gyugyi**, "Understanding FACTS: Concepts and Technology of FACTS Systems", Wiley-IEEE Press, 1999.
2. **K. R. Padiyar**, "FACTS Controllers in Power Transmission and Distribution", New Age International (P) Ltd. 2007.
3. **T. J. E. Miller**, "Reactive Power Control in Electric Systems", John Wiley and Sons, New York, 1983.
4. **R. C. Dugan**, "Electrical Power Systems Quality", McGraw Hill Education, 2012.
5. **G. T. Heydt**, "Electric Power Quality", Stars in a Circle Publications, 1991.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: Virtual Instrumentation **Max. Marks: 100**
Course Code: PEC-EE-823 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: In this course the student gets an in depth knowledge of Virtual Instruments and their applications in the field. The students will be familiarized to programming techniques and different applications of virtual instruments.

Detailed contents:

Unit-I
Virtual Instrumentation: Historical perspective, advantages, blocks diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, comparison with conventional programming. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active X programming.

Unit-II
Programming Techniques: VIs and sub-VIs, loops and charts, arrays, dusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

Unit-III
Data Acquisition Basics: Introduction to data acquisition on PC, Sampling fundamentals, Input/output techniques and buses. ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirement.

Unit-IV
Chassis Requirements: Common Instrument Interfaces: Current loop, RS *232C/* RS485, GPIB. Bus Interfaces: USB, PCMCIA, VXI, SCSI, PCI, PXI, Fire wire. PXI system controllers, Ethemet control of PXI. Networking basics for office & Industrial applications, VISA and M.

Unit-V
Applications: Virtual instrumentation Toolsets, Distributed I/O Units. Application of Virtual Instrumentation: Instrument Control, Development of process database management system, Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control.

Course outcome:
At the end of this course, the student will be able to:
CO1. Understand the historical perspective, architecture and data flow techniques involved in virtual instruments.
CO2. Analyze techniques of programming along with publishing measurement data in the web.

CO3. Understand sampling techniques, ADC and DAC in data acquisition systems.

CO4. Understand fundamental concepts of networking in addition with common instrument interfaces.

CO5. Analyze the importance and application of virtual instruments.

Text Books/ References:

1. **Gary Johnson**, "LabViEW Graphical Programming, 2nd Edition, McGraw Hill, New York, 1998.
2. **Usa K. Wells & Jeffrey Travis**, "LabViEW for everyone', Prentice Hall, New Jersey, 1998.
3. **Jane W. S. Liu**, "Real-time Systems~ Pearson Education India, 4001.
4. **Jean J. Labrosse**, "Embedded Systems Building Blocks: Complete and ready-to-use units in CN.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Course Title: Neural Networks and Fuzzy Systems **Max. Marks: 100**
Course Code: PEC-EE-824 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course familiarizes students with the introduction and application of neural networks and Fuzzy Systems.

Detailed Contents:

Unit-I

Introduction to neural networks: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch- Pitts Model, Historical Developments, Potential Applications of ANN.

Unit- II

Essentials of artificial neural networks: Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

Unit–III

Learning Paradigms: Introduction to various learning algorithms, back propagation algorithm, pattern classification, clustering, Kohonen self-organizing feature map, radial basis function network, support vector machines, Hopfield network, Associative memory and BAM, Applications of ANN models to engineering problems.

Unit –IV

Fuzzy systems: Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions and its types. Fuzzification, defuzzification. Methods of defuzzification. Fuzzy inference systems.

Unit –V

Hybrid Intelligent Systems: Genetic algorithms, neuro-fuzzy systems, adaptive neuro-fuzzy inference system, evolutionary neural networks, fuzzy evolutionary systems. Illustration of these systems with examples from power system etc.

Course Outcome:

The course is aimed to introduce students to neural networks and fuzzy theory from an engineering perspective and their application real world control problems. This course will enable student to learn:

CO1. Introduction to Neural networks and various neural network models

CO2. Various important concepts related with neural networks

CO3. Various learning paradigms in artificial neural networks

CO4. How fuzzy systems are used to solve problems of uncertainties.

CO5. How various artificial intelligence methods are clubbed to introduce hybrid systems.

Text Books/References:

1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS Publishing Company, (2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.
3. **ValluruRao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co *(1998)*
4. **Freeman**, Neural Networks, Pearson Publication (2003).
5. **Rajasekaran&Pai**, Genetic Algorithms; Synthesis and applications, Prentice Hall of India (2004).

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Course Title: Optimization Techniques **Max. Marks: 100**
Course Code: PEC-EE-825 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The course has been designed for explaining the various optimization techniques being used for solving various problems of engineering.

Detailed Contents:

Unit-I
Introduction: An overview of optimization problems, Need of Optimization, How to solve optimization problems with some illustrative examples.

Unit-II
Linear Programming: Introduction, graphical method, simplex method, method of artificial variables, alternate optima, redundancy in linear programming, degeneracy and cycling, the simplex tableau in condensed form.

Unit-III
Nonlinear programming: Introduction, Lagrange multipliers, Karaush-Kuhn-Tucker (KKT) optimality conditions, convexity, sufficiency of the KKT conditions, Duality and convexity.

Unit-IV Approximation Techniques
Introduction, line search methods, gradient-based methods, approximation under constraints.

Unit-V
Dynamic Programming: Sequential optimization; Representation of multistage decision process; Types of multistage decision problems; Concept of sub optimization and the principle of optimality; Recursive equations – Forward and backward recursions; Computational procedure in dynamic programming (DP); Discrete versus continuous dynamic programming; Multiple state variables; curse of dimensionality in DP.

Course Outcome:
This will enable student to:
CO1. Learn the basics about optimization problem.
CO2. Solve linear problems using optimization.
CO3. Solve non-linear problem using optimization.
CO4. Use various approximation techniques for problem solving.
CO5. Use dynamic programming for problem solving.

Text Books/References:
1. **Pablo Pedregal** ,Introduction to optimization, Publisher: Springer

2. **Suresh Chandera, Jaydeva, and Aparna Mehta**, Numerical optimization with applications, Publisher: Narosa
3. **Edvin K.P. Chong, and Stanislaw H. Zak**, An Introduction to optimization, Publisher: John Wiley.
4. **Mohan C. Joshi and Kannan M Moudgalya**, Optimization theory and practice, Publisher: Narosa.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Power System Transients **Max. Marks: 100**
Course Code: PEC-EE-826 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course makes a student familiar with the transient phenomenon occurring in electrical power system-their origin, effects and control. It also familiarizes students with simulation of surge diverters in power system transients.

Detailed Contents:

Unit-I

Surges and Transients: Origin and nature of transients and surges, Surge parameters of plan. Equivalent circuit representations. Lumped and distributed circuit transients.

Unit-II

Transient Control: Line energization and de-energization transients. Earth and earth wire effects. Current chopping in circuit breakers. Short line fault condition and its relation to circuit breaker duty. Trapped charge effects. Effect of source and source representation in short line fault studies. Control of transients.

Unit-III

Wave Control: Lightening Phenomenon. Influence of tower footing resistance and earth resistance. Traveling waves in distributed parameter multi conductor lines, parameters as a function of frequency.

Unit-IV

Simulation: Simulation of surge diverters in transient analysis. Influence of pole opening and pole reclosing.

Unit-V

Insulation coordination: Insulation Co-ordination: Over voltage limiting devices, dielectric properties, breakdown of gaseous insulation, tracking and erosion of insulation, high current arces, and metallic contacts.

Course Outcome:

This course will enable students to:

CO1. Understand nature and origin of surges and transients in power system.
CO2. Analyze the effects of Earthing and controlling of power surges.
CO3. Understand lightning phenomenon and travelling waves in multi-conductor lines.
CO4. Understand breakdown phenomenon and dielectric properties of insulating materials.
CO5. Analyze various phenomenon involved in breakdown of gaseous insulation along with basics of over voltage limiting devices.

Text Books/ References:

1. **Lou van der Sluis,** Transients in Power Systems John Wiley & Sons.
2. **Vanikov V. A.,** Transients in Power Systems by, Mir Publications, Moscow.
3. **Bewley L.V.,** Traveling Waves on Transmission Lines Dover Publications Inc., New York.
4. **RavinderaArora,WolfgangMosch**, High Voltage Insulation Engineering, New Age International Publishers Limited.
5. **Greenwood A.** Electrical Transients in Power Systems John Wiley & Sons.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Line-Commutated Active Rectifiers **Max. Marks: 100**
Course Code: PEC-EE-827 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: The objective of this course to give Fundamental knowledge about the operations of PWM rectifier and Line commutated rectifier.

Detailed Contents:

Unit-I

Diode and Thyristor rectifiers with passive filtering: Half-wave diode rectifier with RL and RC loads; 1-phase full-wave diode rectifier with L, C and LC filter; 3-phase diode rectifier with L, C and LC filter; continuous and discontinuous conduction, input current wave shape, effect of source inductance; commutation overlap.
Half-wave thyristor rectifier with RL and RC loads; 1-phase thyristor rectifier with L and LC filter; 3-phase thyristor rectifier with L and LC filter; continuous and discontinuous conduction, input current wave shape.

Unit-II

Multi-Pulse converter: Review of transformer phase shifting, generation of 6-phase ac voltage from 3-phase ac, 6-pulse converter and 12-pulse converters with inductive loads, steady state analysis, commutation overlap, notches during commutation.

Unit-III

Single-phase ac-dc single-switch boost converter: Review of dc-dc boost converter, power circuit of single-switch ac-dc converter, steady state analysis, Unity power factor operation, closed-loop control structure.

Unit-IV

Ac-dc bidirectional boost converter: Review of 1-phase inverter and 3-phase inverter, power circuits of 1-phase and 3-phase ac-dc boost converter, steady state analysis, operation at leading, lagging and Unity power factors. Rectification and regenerating modes. Phasor diagrams, closed-loop control structure.

Unit-V

Isolated single-phase ac-dc fly back converter: Dc-dc fly back converter, output voltage as a function of duty ratio and transformer turns ratio. Power circuit of ac-dc fly back converter, steady state analysis, Unity power factor operation, closed loop control structure.

Course Outcome:

At the end of this course, students will demonstrate the ability to

CO1 Analyze different rectifier circuit with passive filter.

C02. Express the design and control of 6 pulse and 12 pulse converter.
CO3. Analyze the operation of single phase AC/DC single switch converter.
C04. Understand the working and control of AC/DC bi directional boost converter.
CO5. Analyze the operation of Isolated AC/DC fly back converter.

Text Books/ References:

1. G. De, "Principles of Thyristorised Converters", Oxford & IBH Publishing Co, 1988.
2. J.G. Kassakian, **M. F. Schlecht and G. C. Verghese**, "Principles of Power Electronics", Addison-Wesley, 1991.
3. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.
4. N. Mohan and **T. M. Undeland**, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
5. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2001.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: High Voltage Engineering **Max. Marks: 100**
Course Code: PEC-EE-828 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Course Objective: This course familiarizes the students with working principles, operation, measurement and testing of high voltage systems and equipment.

Detailed Contents:

Unit-I

Conduction and Breakdown in Gases: Gases as insulators, ionization, current growth, Townsend's criterion for breakdown, electro-negative gases, Paschen's Law, Streamer breakdown mechanism, corona discharges, post breakdown phenomena, practical considerations in using gases for insulating materials.

Unit-II

Conduction and Breakdown in Liquid Dielectrics: Classification of liquid dielectrics, conduction and breakdown in pure liquids and in commercial liquids.

Unit-III

Breakdown in Solid Dielectrics: Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, breakdown of composite insulation, solid dielectric used in practice.

Unit-IV

Applications of insulating materials in different electrical apparatus: Applications in power transformers, rotating machines, circuit breakers, cables, power capacitors, electronic equipment.

Unit-V

Generation & Measurement of High Voltages and Currents: Generation of high d.c. and a.c. voltages, generation of impulse voltages and currents.
Measurement of high d.c., a c. and impulse voltages, Measurement of high d.c, a.c and impulse currents.

Course Outcome:

At the end of this module students will be able to:

CO1. Understand different breakdown mechanisms in gases as well as post breakdown mechanisms.
CO2. Analyze different conduction and breakdown mechanisms in liquid dielectrics.
CO3. Analyze different conduction and breakdown mechanisms in solid dielectrics.
CO4. Foresee applications of different insulating materials in electrical apparatus.

CO5. Analyze the different techniques of generation and measurement of high voltage and current.

Text Books/ References:

1. **E. Kuffel, W.S Zaengl**, High Voltage Engineering Fundamentals, TMH.
2. **M.S. Naidu, V. Karamraju**, High Voltage Engineering, TMH.
3. **Dieter kind, Kurt Feser**, High voltage test techniques.
4. **Subir Ray**, An Introduction to High Voltage Engineering.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Dept. copy

Department of Management Studies

Baba Ghulam Shah Badshah University

Rajouri (J&K)

Syllabus

For

4 Years BBA Degree Programme

As per

The New Education Policy

NEP- 2020

(w.e.f August 2022)

Department of Management Studies
Baba Ghulam Shah Badshah University
Rajouri, J&K 185234, INDIA

Credit Plan for the 4 years BBA Degree programme under NEP 2020

(From the academic session 2022 onwards)

Each student will study:

For Major course (in the discipline of Business Administration)

- 62 credits for three year graduation
- 94 credits for four year graduation(Honours)
- 82 credits for four year graduation (Honours) with Research

For Minor Course

- 24 credits for three year Graduation from 1st to 6th semester (4 Credits in each Semester)
- 32 Credits in same subject for four year Graduation (Honors) with Research

For Multidisciplinary Courses from other disciplines (Foundation Courses)

- 9 Credits (3 credits each from 1st to 3rd semesters from disciplines other than Major and Minor).

For Ability Enhancement Course (AEC)

- 9 Credits (three Credits each from 1st to 3rd Semester).

For Skill enhancement Courses (SEC)

- 6 credits (two Credit each from 1st to 3rd Semester).
- The courses shall be chosen from the basket of courses from NSQF as notified by the BGSB University. The Department can propose new courses in addition to NSQF.

For Value Added Courses (VAC)

A) Compulsory Courses

- 4 credit courses comprising of 2 courses in each 1st and 2nd Semester.
  (a) Understanding India (b) Environmental Science and Education
  (c) Digital Technology (d) Health and Wellness

B) Optional Courses

- 2 credit courses in each 3rd and 4th Semester.

(a) Community Engagement (b) National Cadet Corp (NCC)
(c) National Service Scheme (NSS) (d) Sports
(e) Cultural (f) Yoga Education

Summer Internship

- Each student is required to undergo 2 credits of internship in 5th semester. The details of the Summer Internship shall be notified separately.

Research Project/Dissertation

- Students pursuing Under Graduate Degree with research shall be required to undergo a Research Project/Dissertation of 12 credits in 8th semester.

Credit summary

1 Year Certificate = minimum 40 credits
2 Year Diploma = minimum 80 credits
3 Year Degree = 120 credits
4 Year Degree = 160 credits

Credit Allocation for Semester I and II of BBA Programme

Discipline	Semester-I		Credits	Semester-II Exit Option (U.G Certificate In Business Administration)		Credits
Major	Business Administration	Same discipline (1 from Major &1 from Minor)	4	Business Administration	Same discipline (1 from Major &1 from minor)	4
Minor	Business Administration		4	Business Administration		4
Multi-disciplinary Course	Interdisciplinary Nature (From faculties other than Major and Minor)	Arabic/ French/ Education	3	Interdisciplinary Nature	Hospitality Management/ Education/Arabic	3
Ability Enhancement	Modern Indian Languages and Mathematical Ability	Communication skills	3	Modern Indian Languages and Mathematical Ability	Business Statistics.	3
Skill Enhancement	NSQF	Professional excellence	2	NSQF	Event Management	2
Value added	Environmental Studies/ Health and Wellness/Understanding India/Digital Technology	1.EVS 2. Health and Wellness	2 2	Environmental Studies/ Health and Wellness/Understanding India/Digital and Technological solutions	1.Understanding India 2.Digital and Technological Solutions	2 2
Total Credit per Semester			20			20

Course Structure of BBA Semester I						
Discipline	Course Code	Title of the Course	SEE	CCE	Total Marks	Credits
Major Course	BBA –MJ-101	Management Principles & Practices	60	40	100	4
Minor Course	BBA –MR-102	Fundamentals of Accounting	60	40	100	4
Multi Disciplinary Course	BBA-MD-103	Soft Skill for Business (Offered by DMS for Students of other Faculties)	45	30	75	3
		For Students of BBA(Offered by faculties other than Management)				
Ability Enhancement Course	BBA –AE-104	Communication Skills	45	30	75	3
Skill Enhancement Course	BBA –SE-105	Professional Excellence in Business	30	20	50	2
Value Added Courses	BBA –VA1-106	Health and Wellness	30	20	50	2
	BBA –VA2-107	Environmental Studies (EVS)	30	20	50	2
Total			300	200	500	20

Internal Break up (Credit wise)		
Number of credits	Comprehensive & Continuous Evaluation	CCE Breakup
4 Credit	40	a) 16 Marks - Term Paper. b) 14 Marks -Presentation/ Viva/Assignment. c) 25% of Internal Component (10 Marks) - Classroom Attendance.
3 Credit	30	a) 12 Marks - Term Paper. b) 10.5Marks -Presentation/ Viva/Assignment. c) 25% of Internal Component (7.5 Marks) - Classroom Attendance.
2 Credit	20	a) 8 Marks - Term Paper. b) 7 Marks - Presentation/ Viva/Assignment. c) 25% of Internal Component (5 Marks) - Classroom Attendance.
		Attendance breakup Below 75 percentage =Shortage 76-80 =40% 81-85 =60% 86-90 =80% 91 and above 100%

*Note: Only those students will be eligible for appearing in the final examination who will qualify the internal assessment component i.e., CCE (*Comprehensive & Continuous Evaluation*).*

Note for Paper Setting

For 4 credit	The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 10 long answer type questions, two from each unit. The students will be required to answer 05 questions, one from each unit, each question carries 10 marks. The internal assessments for 4 credit course will be 40.
For 3 credit	The question paper will be divided into two sections. **Section A** will be compulsory and will contain 09 objective-cum-short answer type questions, covering entire four units, each carrying 01 mark. **Section B** will contain 08 long answer type questions, two from each unit. The students will be required to answer 04 questions, one from each unit, each question carries 09 marks. The internal assessments for 3 credit course will be 30.
For 2 credit	The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The internal assessments for 2 credit course will be 20.

Semester I

SEE: Semester End Examination
CCE: Comprehensive & Continuous Evaluation

Department of Management Studies BGSB University, Rajouri	
Course Type: Major Course **Course Code:** BBA –MJ-101 **Course Title:** Management Principles and Practices **Credit:** 04	**Max Marks:** 100 **SEE-** 60 **CCE-**40
Course Outcomes: On successful completion of the course, the Students will be able to 1. Explain the evolution of management & analyze the principles of management which enables them to gain valuable insights. 2. Utilize the appropriate approach and analytical skills to deal with issues that arise when one is employed or in any management situations in the organization. 3. Illustrate the basic concepts of planning and organizing. 4. Determine the directing and control process including: the importance of control, tools for measuring organizational performance, and managerial actions. 5. Identify and evaluate social responsibility and ethical issues involved in business situations.	
Unit 1.	Management Concepts, nature, importance, Management as Art, Science and Profession; Principles and Functions, Scientific Management by F.W. Taylor, Administrative Management by Henri Fayol, Bureaucratic Management by Webber, Human Relations Approach by Elton Mayo, Systems Approach and Contingency Approach
Unit 2.	Mintzberg's Managerial Roles (Interpersonal roles, Informational roles and Decisional roles), Management Levels and Skills; Challenges of management; Work Life Balance
Unit 3.	Management Process; Planning Concept, Objectives, Types and Steps in Planning, Strategic Planning; Management by objectives (MBO); Decision Making and Steps in Decision Making. Forecasting meaning, Organizing definition and characteristics; Principles of Organization, Organizational Structure-Peter Drucker; Types of organizational structure- formal and informal: Authority, responsibility and accountability, span of control; Delegation of Authority.
Unit 4.	Staffing Function- meaning, process and importance, Directing- Definition and Nature; types and barriers, Leadership- definition and styles, Motivation-definition, theories-Maslow's, Herzberg's and McGregor's Theories of Motivation, Communication: Types and Barriers, Controlling: Meaning, process & Importance, Process of Control, types of control; Employee Engagement, Employee Management System
Unit 5.	CSR- meaning, definition and importance; Areas of corporate social responsibility; Ethics-definition, meaning and importance; Basic approaches to Ethics; Ethical and Unethical Behaviour, Whistle Blowing, Encouraging ethical Behaviour and Creating an ethical workplace , Current corporate social responsibility and ethics issues.
Recommended book(s)	1. Principles of Management: Tripathy, P.C. and P.N. Reddy, Tata McGraw Hill Pub. Co., Ltd. 6th Edition 2017. 2. Principles and Practices of Management: B.P Singh, T N Chabra, Dhanpat Rai Publication, Delhi 3. Principles of Management: An Analysis of Managerial Functions:Koontz, O'Donnell, McGraw Hill, Tokyo

Department of Management Studies
BGSB University, Rajouri

Course Type: Minor Course | **Max Marks:** 100
Course Code: BBA-MR- 102 | **SEE:**60
Course Title: Fundamentals of Accounting | **CCE:**40
Credit: 04

Course Outcomes: On successful completion of the course, the Students will be able to

1. Understand the basics of Accounting and its importance to business Management.
2. To gain knowledge about accounting records.
3. To understand the accounting cycle.
4. To know about the accounting principles.
5. To know the process of preparing end results.

Unit 1.	Accounting: Objectives, need and development of accounting. Functions of accounting, nature, scope and importance of accounting, process of accounting, accounting cycle, difference between accounting and book keeping. Generally accepted accounting Principles (GAAP). Accounting equation, types of accounts.
Unit 2.	Journalizing of Transactions: origin of transaction and source documents, rules of debit and credit for assets, for liabilities, for capital, for revenue and for expenditure. Journal, format and utility of journal, purpose and need of journal, types of journal, general and special journal.
Unit 3.	Ledger posting: format, utility and accounting treatment of ledger posting. Trial balance: objectives and preparation. Errors effecting Trial balance.
Unit 4.	Depreciation Accounting: causes and need for charging depreciation, factors affecting the amount of depreciation, methods of calculating depreciation and accounting treatment (Straight line method and diminishing balance method).
Unit 5.	Financial Statements: Objectives of financial statements, uses of financial statements. Difference between trading account and profit and loss account. Preparation of financial statements (Sole proprietor & Partnership only).
Recommended book(s)	1. T S Grewal (2010), Financial Accounting, Sultan Chand & Sons, New Delhi. 2. Naseem Ahmad & Javed Iqbal (2019), Financial Accounting by New Delhi Publishers. 3. Dearden J and S K Bhattacharya (2007), Accounting for Management by Vikas Publishers, New Delhi. 4. Gupta R L & Gupta V L (2018). Financial Accounting by Sultan Chand & Sons , Publishers, New Delhi. 5. Monga J R (2019), Basics of Accounting by Scholar Tech Press, Delhi.

Department of Management Studies
BGSB University, Rajouri

Course Type: Multi disciplinary Course
Course Code: BBA- MD-103
Course Title: Soft Skills for Business
Credit: 03

Max Marks: 75
SEE- 45
CCE-30

Course Outcomes: On successful completion of the course, the students will be able

1. To improve speaking and listening skills in communication,
2. To learn about effective use of non verbal communication skills.
3. To develop social skills
4. To know about basic rules of business etiquette.

Unit 1.	Introduction: Understanding communication and importance of communication. Understanding communication environment. Meaning and importance of Listening and Speaking skills. Developing effecting listening and speaking skills. Starting and sustaining conversation. Effective interaction skills.
Unit 2.	Non verbal communication skills: Meaning and importance of non verbal communication skills in personal and professional life. Appropriate and contextual use of facial expressions, gestures, para-linguistics (such as loudness or tone of voice), body language, proxemics or personal space, eye gaze, haptics (touch), appearance
Unit 3.	Social skills: Interpersonal and intrapersonal skills, Understanding the importance of various skills involved in developing enriching interpersonal relationships. Social skills for workplace success. Methods for improving social skills, Negotiation skills and Conflict handling skills
Unit 4.	Business etiquettes: Introduction to business etiquette, basic rules of etiquette, rules for developing introduction correctly, telephone etiquette, business dining and table manner business to business etiquette, negotiation skills, factor effecting negotiations, negotiation process
: Recommended book(s)	1. Varinder Kumar, Bodh Raj; Business Communication Skills, Kalyani Publishers, NewDelhi, latest edition. 2. Lesikar/Flatly ; (2009) Business Communication , Tata McGraw Hill. 3. Jeff Butterfield; (2012) Soft Skills for Everyone, Cengage Learning centre. 4. Rai and Rai ; Business Communication Prentice Hall, New Delhi 5. Namita Gobar; (2009) Business communication, New Age International Publisher. 6. *C. S. Rayudu* ; Communication skills , Edition, 9 ; Himalayan Publishing House,

Department of Management Studies BGSB University, Rajouri	
Course Type: Ability Enhancement Course **Course Code:** BBA-AE-104 **Course Title:** Communication Skills **Credit :03**	**Max Marks: 75** **SEE- 45** **CCE-30**
Course Outcomes: On successful completion of the course, the students will be able 1. To understand the importance of communication in business. 2. To learn the process and importance of oral presentations and Group discussions. 3. To develop effective writing skills 4. To learn about negotiation skills 5. To learn about business etiquette	
Unit 1.	Introduction: Meaning, Nature and Scope of Communication, levels of communication , Importance and Purpose of Communication, Process of Communication, Types of Communication, Barriers to Communication, Principles of effective communication
Unit 2.	Oral Presentation: Principles of Oral Presentation, designing formal presentation, development of presentation content, delivering presentation guidelines, factors effecting presentation, Group Discussion: Concept and basic framework of Group Discussion, methods of group discussion, critical success factors for group discussion.
Unit 3.	Writing Skills: Meaning and Importance of Writing skills, Purpose of writing, Principles of effective writing, writing business letters, memos and Paragraphs , Report Writing :Characteristics of a good re[ort , types of reports(letter Report, memo report, routine report,progress report , business report) , general elements of report
Unit 4.	Business etiquettes: Introduction to business etiquette, basic rules of etiquette, rules for developing introduction correctly, telephone etiquette, business dining and table manner, business to business etiquette, negotiation skills, factor effecting negotiations, negotiation process.
Recommended book(s)	1. Varinder Kumar, Bodh Raj; Business Communication Skills, Kalyani Publishers, NewDelhi, latest edition. 2. Lesikar/Flatly ; (2009) Business Communication , Tata McGraw Hill. 3. Jeff Butterfield; (2012) Soft Skills for Everyone, Cengage Learning centre. 4. Rai and Rai ; Business Communication Prentice Hall, New Delhi 5. Namita Gobar; (2009) Business communication, New Age International Publisher. 6. *C. S. Rayudu* ; Communication skills , Edition, 9 ; Himalayan Publishing House,

Department of Management Studies BGSB University, Rajouri	
Course Type: Skill Enhancement Course **Course Title:** Professional Excellence in Business **Course Code:** BBA-SE-105 **Credits:** 02	**Max Marks:** 50 **SEE-** 30 **CCE-**20
Course Outcomes: On successful completion of the course, the students will be able to 1. Enhance the knowledge of professionalism. 2. Develop personal and interpersonal skills 3. Develop customer centric approach for business	
Unit 1.	**Introduction:** Meaning of professionalism, importance of professionalism, difference between profession, professional and professionalism, professionalism on and off workplace, handling customers and identifying their need
Unit 2.	**Personal skills:** Meaning, importance, personal development, physical and mental fitness **Interpersonal skills:** core interpersonal skills, building interpersonal relationship
Unit 3.	Management games, managing customer centric approach for business, resume preparing activities, team building activities, leadership development activities.
Recommended book(s)	1. Alan P. Rossiter, 2008 "Professional excellence: beyond technical competence 2. Frederic P. Bemak. Ronert K. Conyne. 2017 "journey to professional excellence. 3. Sharma. P. 2020 "soft skills personality development for life success".

Department of Management Studies BGSB University, Rajouri	
Course Type: Value Added Course **Course Code:** BBA –VA1-106 **Course Title:** Health and Wellness **Credit :02**	**Max Marks:50** **SEE- 30** **CCE-20**
Course objective: The course aims at creating consciousness among the students towards health, fitness and wellness and in developing and maintaining a healthy life style. **Course Outcomes:** On successful completion of the course, the students will be able 1. To help to understand the importance of healthy lifestyle 2. To familiarize students about physical and mental healthiness 3. To create awareness of various lifestyle related disease 4. To provide understanding of stress Management.	
Unit 1.	**Introduction to Health and Wellness** Define and differentiate health and wellness. Importance of health and wellness education. Local demographic, societal issues and factors affecting health and wellness. Diet and nutrition for health and wellness. Essential components of balanced diet for healthy living with specific reference to the role of carbohydrates, proteins, fats vitamins and minerals.
Unit 2.	**Malnutrition:** Under nutrition and over nutrition. Processed food and unhealthy eating habits. Body system and common diseases. Sedentary lifestyle and its risk of disease. Stress, anxiety and depression. Factors affecting Mental health. Identification of suicidal tendencies. Substance abuse (Drugs, Cigarettes, alcohols) De-addiction, Counseling and rehabilitation.
Unit 3.	**Management of Health and Wellness:** Healthy food for prevention and progression of Cancer, hypertension, cardiovascular and metabolic disease (Obesity, diabetes, polycystic ovarian syndrome) Types of physical fitness and its health benefits. Modern life style and hypo-kinetic disease: Prevention and management through exercise. Postural deformities and corrective measures. Spirituality and mental health. Role of Yoga, asanas and meditation in maintaining health and wellness. Role of Sleep in maintenance of physical and mental health
Recommended Books	1. Physical Activity and health by Claude, Bouchard, Steven N Blair, William L Haskel. 2. Mental Health workbook by Emily attached and Marzia Fernadez 2021 3. Life style disease: Life style disease management by C. Nyambichu and Jeff Lumiri 2018 4. AAPHERD. "Health Related Physical Fitness Test Mannual". 1980 Published by Association drive Reston Virginia · 5. ACSM Fitness Book, Leisure Press Campaign, Illions, 1996, Leisure Press, Canada http://www.pitt.edu./-gsphhome · 6. ACSM"s "Health Related Physical Fitness Assessment Manual Lippincott Williams and Walkins USA, 2005.

Department of Management Studies BGSB University, Rajouri	
Course Type: Value Added Course Course Code: BBA-VA2-107 Course Title: Environmental Studies (EVS) Credit: 02	Max Marks50 SEE- 30 CCE-20
Learning Objective: The course attempts to create pro-environment attitude and a behavioral pattern in student community and society that attaches importance and priority to create sustainable life style and awareness on various environmental issues. Course Outcomes: The course is expected to inculcate a critical thinking on various dimensions of environment through knowledge, skill, critical thinking and problem solving	
Unit 1	Understanding the Environment Environment: Concept, importance and components. Ecosystem: Concept, structure and function, Food chains, food web, ecological pyramids & energy flow. Ecosystem Services: Provisioning, regulating & cultural
Unit 2	Biodiversity: Levels, Values, threats and conservation. Concept and objectives of environmental education, environmental ethics. Natural Resources: Renewable and Non-renewable (Global status, distribution & production). Management of natural resources: Individual, community and Government Level
Unit 3	Environmental Pollution Air, water & soil pollution: Causes, Consequences and Control Solid Waste Management: Collection, segregation, transportation and disposal, 3R's Climate Change: Causes & Consequences
Recommended book(s)	1. Asthana, D.K. Text book of Environmental Studies. S. Chand Publishing 2. Basu, Xavier, S. Fundamentals of Environmental Studies, Cambridge University Press, India 3. Agarwal KC (2018), Environmental Biology, Nidi Publication Ltd, Bikaner. 4. Bharucha Erach (2016), Environmental Studies, PHI.

Course Structure of BBA Semester II Exit Option (U.G Certificate In Business Administration)						
Discipline	**Course Code**	**Title of the Course**	**SEE**	**CCE**	**Total Marks**	**Credits**
Major Course	BBA –MJ-201	Organizational Behavior	60	40	100	4
Minor Course	BBA –MR-202	Managerial Economics	60	40	100	4
Multi Disciplinary Course	BBA-MD-203	Fundamental of Banking and Insurance (Offered by DMS for Students of other Faculties) For BBA Students(Offered by Faculties other than Management)	45	30	75	3
Ability Enhancement Course	BBA –AE-204	Business Statistics	45	30	75	3
Skill Enhancement Course	BBA –SE-205	Event Management	30	20	50	2
Value Added Courses	BBA –VA1-206	Understanding India	30	20	50	2
	BBA –VA2-207	Digital and Technological Solutions	30	20	50	2
Total			300	200	500	20

Semester II

Department of Management Studies BGSB University, Rajouri	
Course Type: Major Course **Course Code:** BBA –MJ-201 **Course Title:** Organizational Behavior **Credit:** 04	**Max Marks:** 100 **SEE-** 60 **CCE-**40
Course Outcomes: On successful completion of the course, the student will be able to: 1. Explain the models, challenges and opportunities in the field of organization behavior. 2. Analyze the behavior of individuals in the workplace as influenced by personality, values, perceptions and learning. 3. Outline the elements of group behavior including group dynamics, communication, effectiveness and conflict 4. Explain how organizational change and culture affect working relationship within organizations.	
Unit 1	**Introduction:** Concept, Features, Scope and nature of organizational behavior, contributing disciplines to the field of organizational behavior, Individual behavior; Determinants and Models of Individual Behavior, O.B Models; Need to understand human behavior; Challenges and Opportunities.
Unit 2	**Attitudes and Perception:** Concept of attitude; attitude, opinions and beliefs; attitudes and behavior; theories of attitude; formation of attitude; factors determining formation of attitude, Definition and meaning of perception; process of Perception; factors influencing perception, Barriers to Perception.
Unit 3	**Personality Development:** Definition and meaning of personality, types of Personality, theories of development of Personality, Factors contributing personality development. **Learning:** Meaning, importance, theories, principles of learning, determinants of learning and process of learning
Unit 4	**Group Dynamics:** The concept of groups, types and functions, stages of group development, group cohesiveness, group thinking, group dynamics, determinants of group behavior, importance of informal groups to the organization, group decision making.
Unit 5	**Organizational Change and Effectiveness:** Organizational change, resistance to change, change Management Process organizational effectiveness; effectiveness and productivity; approaches of organizational effectiveness; contributing factors of organizational effectiveness.
Recommended book(s)	1. Stephen P Robbins (2012), Organization Behavior, 12th Edition, Pearson Education Asia. 2. Greenburg and Baron (2010), Behavior in Organization, Pearson Publications. 3. Fred Luthans (2010),Organization Behaviour, 10thEdition, Tata McGraw Hill. 4. Prasad L. M. (2011), Organizational Behavior, Sultan Chand Publications. 5. Gupta S.K&Joshi Rosy (2012), OrganisationalBehaviour, Kalyani Publishers

Department of Management Studies BGSB University, Rajouri	
Course Type: Minor Course **Course Code:** BBA –MR-202 **Course Title:** Managerial Economics **Credit:** 4	**Max Marks: 100** **SEE- 60** **CCE-40**
Course Outcomes: On successful completion of the course, the Students will be able to 1. Understand the basics of economics and its importance to business Management. 2. To gain knowledge about demand and utility. 3. Understand production function analysis. 4. To know about different markets and how they determine price and optimum output. 5. To understand concept of inflation and business cycle	
Unit 1.	Definitions and nature of economics, Economics is a science or art, scope and limitation of micro and macro economics, relevance of economics in business management, discounting and opportunity cost principles of economics.
Unit 2.	Demand analysis and forecasting: meaning , types and determinants of demand, demand schedule, demand curve, Law of demand, exception to law of demand, Demand Function and Elasticity of Demand and its uses in Business decisions, consumer utility, consumer surplus, law of equi- marginal utility and law of indifference curve. Demand forecasting meaning and methods of demand forecasting.
Unit 3.	Production Analysis: Concept of Production, Factors, Laws of Production, Economies and diseconomies of scale. Cost Analysis: Cost Concept, Types of Costs, Cost function and cost curves, Costs in short and long run, LAC and Learning Curve.
Unit 4.	Market Analysis: nature, types and characteristics of different markets, Price-output determination in perfect competition, monopolistic, monopoly and oligopoly markets, Price discrimination under monopoly, degrees of discrimination.
Unit 5.	Introduction to Macro Economics. National Income Aggregates. Concept of Inflation, Policy Interrelationships – Tools of Fiscal and Monetary Policies. Business cycle.
Recommended book(s)	1. Agarwal M.K. (2015), Industrial Economics, New Age International. 2. Thomas & Maurice (2015), Managerial Economics, Tata McGraw Hill 3. Koutsoyiannis.A. (2013) Modern Micro Economics. Mc Millan 4. Peterson H.C & Lewis (2003) Managerial economics, Tata McGraw Hill

Department of Management Studies BGSB University, Rajouri	
Course Type: Ability Enhancement Course **Course Title: Business Statistics** **Course Code: BBA –AE-204** **Credits: 03**	**Max Marks:75** **SEE- 45** **CCE-30**
Course Outcomes: On successful completion of the course, the students will be able to 1. Understand the concept of statistics, data, its method of data collection and various sampling techniques. 2. Find and interpret the central tendencies of various types of data sets. 3. Find and interpret the dispersion of various set of data through various measures of dispersion 4. Apply the concept of correlation and regression analysis for various problems 5. Understand the concept of procedure of hypotheses testing.	
Unit 1.	**Introduction:** Concept, Scope and functions of Statistics. Data: Types of data, Methods of data Collection. Classification of Data: Individual data & Grouped data. **Sample and Sampling Techniques:** Concept of Population, Census and sample; Techniques of Sampling, Random and Non Random Sampling Techniques.
Unit 2.	**Measures of Central Tendency:** Arithmetic Mean, Median and Mode for grouped and ungrouped data, Direct and Assumed Mean Method, Cases of Missing frequencies and Inclusive series.
Unit 3.	**Measures of Dispersion:** Concept of dispersion, Absolute and relative measure of dispersion, Range, Absolute mean deviation, Variance, Standard deviation, Coefficient of variation, Quartile Deviation, Coefficient of Quartile deviation.
Unit 4.	**Correlation and Regression (for ungrouped data):** Concept and types of correlation, Methods of finding correlation coefficient; Graphical method and Karl Pearson's Coefficient of correlation, Rank correlation coefficient **Regression Analysis:** Concept of regression analysis & types of variable, Methods of lease square for finding regression equation of Y on X only
Recommended book(s)	1. Gupta S. P. (2011), Statistical Methods, Sultan Chand and Sons. 2. Sharma J.K. (2010), Business Statistics, Pearson Publication. 3. Hans. V.S., Anil Gupta, S.L. Aggrval & Nissar Ahmed Yatoo, Kalyani Publishers, 2012 4. Levin Richard I, David S Rubin, "Statistics for Management" 8 th edition, Prentice Hall of India

Department of Management Studies BGSB University, Rajouri	
Course Type: Skill Enhancement Course **Course Title:** Event Management **Course Code:** BBA –SE-205 **Credits:** 02	**Max Marks: 50** **SEE- 30** **CCE-20**
Course Objective: This course is to give formal instructions and training to students to be future managers of the Event Industry. So that, they technical proficiency to effectively adjust, grow and excel in the field of Event Management. **Course Outcomes:** On successful completion of the course, the students will be able to 1. CO1: Understand the concept of foundation of events. 2. CO2: To Know about Economic and social significance of MICE 3. CO3: understand about Conference, Convention and Events Venues	
Unit 1.	**Conceptual foundations of Events** Major Characteristics; five C's of event management Conceptualization, Costing, Canvassing, Customization, Carrying out; Advantages of events- to the Organizer, Event Planner, Participants, Economy and Society; Broad classification of Events, Event planning process..
Unit 2.	**Concepts of MICE** Evolution of MICE industry; Components, Economic and social significance of MICE, Planning and Sustainable Planning for MICE; Professional meeting planning- definition, types and roles; associate, corporate & independent meeting planners; TA's and TO's as meeting planner; Responsibilities/Role of Meeting planners.
Unit 3.	**Conference, Convention and Events Venues** Concept and types; Conference venues- facilities, check-in and check-out procedures, requirements; conference room lay-outs; Conventions-meaning, significance and process, Convention manager; Convention visitor Bureaus – functions, structure and funding sources, Introduction to conference facilities in India. Role and functions of ICPB and ICCA.
Recommended book(s)	1. Coleman, Lee &Frankle, Powerhouse Conferences. Educational Institute of AH & MA. . 2. Hoyle, Dorf & Jones, Meaning conventions & Group business. Educational institute of AH & MA. 3. Judith Mair, Conferences and Conventions A Research Perspective Routledge – 20 Series: 4. Montgomery, R.J, Meeting, Conventions and Expositions: VNR, New York 5. Vassilios Ziakas. Event Portfolio Planning and Management A Holistic Approach Rout.

Department of Management Studies
BGSB University, Rajouri

Course Type: Value Added Course
Course Title: Understanding India
Course Code: BBA –VA1-206
Credits: 02

Max Marks:50
SEE- 30
CCE-20

Objective: The aim of the course is to build knowledge, understanding about history, culture and traditions of India

Course Outcomes:

1. To make student aware of the trajectories of historical and cultural development of India and the making of unity in Diversity
2. To Familiarize students with the process of constitution development and its emergence as one of the largest democratic state of the world

Unit 1.	National boundaries and the major geographical attributes; Mountains , Rivers and the mineral Resources. Human Geography; Pattern of demographic distribution with special reference to Tribes in India. Cultural and linguistic Diversity
Unit 2.	Perceptions of the past: Orientalist, Colonial and the Nationalist construct; Recent construct of the past Bharatavarsha: concept and its evolution: Vedic, Epic and Puranic traditionas and the making of Modern India. State and imperial formation: Rise of Janapadas, The Mauryas, The Kushanas, The Guptas, Pallava, Cholas and Vijayanagara Empire.
Unit 3.	Origin and growth of major religious streams: Vedic, Jainism, Buddhism, Bhakti and Sufism, Brahmo Samaj, Arya samaj, Religious philosophy of Sri Aurobindo Development of temple art and Architecture. Development of literary traditions: Panini, Kalidasa, Veda Vyasa, Valmiki
Recommended book(s)	1. Gore, M. S. (2002). Unity in diversity; The Indian Experience in Nation building, Rawat Publication, Jaipur 2. Kabir, Humayun 1946, R heritage, National Information and publication Limited, Mumbai. 3. S. Chandra (2009), History of Medival India, orient black swan, New Delhi 4. Hemchandra Raychaudhuri "Political History of Ancient India". Surjeet publication 2019 5. Ramesh Thota "Daily Life in Indian Culture: An Insightful Guide to Customs & Tradition" PH Publication, 2019

Department of Management Studies
BGSB University, Rajouri

Course Type : Value Added Course	**Max Marks: 50**
Course Code: BBA –VA2-207	**SEE- 30**
Course Title: Digital and Technological solutions	**CEE- 20**
Credit :02	

Course objective: The objective of this course is to familiarize with digital paradigms and sensitize about role and significance with digital technology.

Course Outcomes: On successful completion of the course, the students will be able

1. To have a knowledge about digital paradigm
2. Realization of importance of digital technology, digital functional tools, e-commerce
3. Know about communication and networks.
4. Familiarity with the e-governance and digital India initiatives
5. An understanding of use and application of digital technology

Unit 1.	**Introduction and Evolution of Digital Systems.** Role and Significances of Digital Technology. Information and Communication Technology and tools computer system and its working, software and its types. **Operating systems:** types and functions. **Problem solving:** Algorithms and flow charts
Unit 2.	**Communication system:** Principles, Model and transmission Media. **Computer Networks and Internet:** Concept and Applications, WWW, Web Browsers, search Engines, Messaging, Email, and Social Networking. **Computer based Information system:** Significance and Types. E-commerce and Digital Marketing: Basic Concepts, Benefits and Challenges
Unit 3.	**Digital India and e governance:** Initiatives, Infrastructure, services and Empowerment. **Digital financial Tools:** Unified payment Interface, Aadhar Payment system, USSD, Credit/Debit cards, e- Wallets
Recommended Books	1. John M. Jordan Information technology and innovation: Resources for growth in Connected World narrated by James Lewis 2. Thomas L. Floyd, Digital Fundamentals Eleventh Edition AICTE recommended by Pearson 3. Siebel. T,(2022) Digital Transformation: Survive and thrive in an era of Mass extinction.

BBA Semester - Third Semester						
Discipline	**Course Code**	**Title of the Course**	**University Examination**	**Internal Assessment**	**Total Marks**	**Credits**
Major Course	BBA –MJ-301	Business law	60	40	100	4
Major Course	BBA –MJ-302	Financial Management	60	40	100	4
Minor Course	BBA-MR-303	Business Ethics and Environment	60	40	100	4
Multi-Disciplinary Course	BBA –MD-304	Leadership Skills in Management (Offered by DMS for students of other faculties)	45	30	75	3
Ability Enhancement Course	BBA –AE-305	Basic course in Hindi	45	30	75	3
Ability Enhancement Course	BBA –AE-306	Basic course in Urdu				
Skill Enhancement Course	BBA –SE-307	Creative Writing in Business	30	20	50	2
Value Added Course	BBA -VAC-308	Physical Education-Yoga	30	20	50	2
Total Credits						22

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

Course Type: Major Course
Course Code: BBA-MJ-301
Course Title: Business law
Credit: 04

University Examination- 60
Internal Assessment-40
Maximum Marks: 100

Course Outcomes:

- To demonstrate the relationship between law and economic activity by developing an awareness of legal principles involved in economic relationships and business transactions.
- To develop an understanding of the free enterprise system and the legal safeguards of the same.
- To develop in the student an appreciation of the significant role played by the judiciary in the protection of individual liberty and private property.
- To develop habit of analytical thinking and logical reasoning as a technique for decision-making.
- To develop in the student acceptable attitudes and viewpoints with respect to business ethics and social responsibility.

Unit 1.	**The Indian Contract Act 1872:** Law of contract, contract and agreement, difference between an agreement and contract, offer and acceptance, capacities of parties, consideration and its essential elements, free consent, legality of object and consideration, Agreements proposed to public policy, void agreements and contingent contracts, performance, discharge and remedies of breach of a contract.
Unit 2.	**The Sale of Goods Act 1930:** Nature and Scope of Sale of Goods Act, 1930, essential elements of contract of sale, difference between sale and agreement to sell, type of goods, conditions and warranties, passing of property, sale by non-owners, delivery and its types, rights of an unpaid seller, rights of buyer.
Unit 3.	**The Negotiable Instruments Act 1881:** Introduction, meaning and nature of negotiable instrument, essential characteristics and types of negotiable instruments; **Promissory Notes:** essential characteristics and parties to promissory notes, bill of exchange and acceptance; **Cheque:** essentials and parties to a cheque, crossing of a cheque, bouncing or dishonor of cheque
Unit 4.	**Indian partnership Act 1932.** Meaning and essential of partnership, nature of partnership firm, types of partner, position of minor as partner, property of the firm, mutual rights and duties, reconstitution of firm and dissolution of firm.
Unit 5.	**Companies Act 2013:** Introduction to companies Act 2013, meaning, characteristics and types of companies, memorandum of association, articles of association, prospectus, share capital and membership, meetings and resolutions, company managements, winding up and dissolution of companies.

Recommended books

- Kapoor N.D. (2012), Mercantile Law, Sultan Chand Publications, New Delhi.
- Avatar Singh (2011), Principal of Merchantile Law, 9th Edition, Tata McGraw Hill.
- C.S Priyanka Gupta (2012), Corporate Legal Environment, Kalyani Publishers.
- Garg and Chawla (2012), Mercantile Law, Kalyani Publishers.
- Tulsian P.C (2011), Mercantile Law, 9th Edition, Tata McGraw Hill.

Note for paper setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 10 long answer type questions, two from each unit. The students will be required to answer 05 questions, one from each unit, each question carries 10 marks.

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

Course Type: Major Course
Course Code: BBA-MJ-302
Course Title: Financial Management
Credit: 04

University Examination- 60
Internal Assessment-40
Maximum Marks: 100

Course Outcomes: On successful completion of the course, the Students will be able to Understand about

- The concept of finance
- Gain knowledge about working capital
- How to Manage inventory in Business
- Optimum capital structure and
- Dividend decisions.

Unit 1.	Financial Management: Introduction, Meanings and Definitions, Goals of Financial Management Finance Functions, Interface between Finance and Other Business Functions. Time Value of Money: Introduction, Rationale, Future Value, Present Value,
Unit 2.	Working Capital Management : Introduction, Components of Current Assets and Current Liabilities, Concepts of Working Capital, Objective of Working Capital Management. Need for Working Capital, Operating Cycle, Determinants of Working Capital, Approaches for Working Capital Management, Estimation of Working Capital
Unit 3.	Inventory Management: Introduction, Role of Inventory in Working Capital, Characteristics of inventory, Purpose of Inventory, Costs Associated with Inventories, Inventory Management Techniques, Importance of Inventory Management Systems
Unit 4.	Capital Budgeting: Introduction, Importance of Capital Budgeting, Capital Budgeting Process, techniques of capital budgeting, Capital Rationing: Introduction, Types, Steps Involved in Capital Rationing, Various Approaches to Capital Rationing
Unit 5.	Capital Structure: Introduction, Features of an Ideal Capital Structure, Factors Affecting Capital Structure, Theories of Capital Structure. Dividend Decisions: Introduction, Traditional Approach, Dividend Relevance Model, Miller and Modigliani Model, Stability of Dividends, Forms of Dividends,

Recommended books

- S.K Gupta & R.K Sharma, 12th revised edition, Financial Management, kalyani publishers. New Delhi.
- I.M Panday New edition, Financial Management, New Delhi.
- Kumar J.K & Ahmed K, (2021) Financial Management AKN Learning, New Delhi.
- M.Y Khan New edition, Financial Management, , New Delhi.

Note for paper setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 10 long answer type questions; two from each unit. The students will be required to answer 05 questions, one from each unit, each question carries 10 marks.

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

Course Type: Minor Course | **University Examination- 60**
Course Code: BBA-MR-303 | **Internal Assessment-40**
Course Title: Business Ethics and Environment | **Maximum Marks: 100**
Credit: 04

Course Outcomes: On successful completion of the course, the Students will be able to

1. Explain the relevance of ethics in business & its management which enables them to gain valuable insights.
2. Utilize the appropriate approach to deal with issues that arise when one is employed or in any management situations in the organization.
3. Illustrate the basic concepts of values and its importance
4. Identify and evaluate social responsibility, ethical, Political, legal and economic issues involved in business situations.

Unit 1.	**Business Ethics**: Nature, objectives, scope, need for business ethics, Relationship between Business and Ethics: Unitarian view of ethics, Separatist view of ethics and Integration view of ethics, ethical theories: meta ethics, normative ethics and applied ethics, ethical dilemmas at work place and their resolution. Work Ethics, importance, Values; Nature, Types and Importance, sources.
Unit 2.	**Management of Ethics**: Corporate Codes--Development and Implementation of Corporate Codes. Corporate Governance, Importance, the current context of corporate governance Theories of corporate governance, Models of Corporate Governance, Ethical Issues in Environment, HR, Marketing, Finance and cyber age.
Unit 3.	**Business Environment**: Meaning, nature and significance of Business Environment, Types of Business Environment, Factors Affecting Business Environment, Components of Environment: Economic, Political, Natural, Social, Demographic and Technological, Need to scan the Business Environment and Techniques of Scanning the Business Environment.
Unit 4.	**Business and Society:** Social Responsibility of business: meaning, nature and Importance. Responsibilities towards different Sections, Social Audit: objectives, methods and obstacles, consumer rights, UN guidelines for consumer protection, consumerism in India, features of Consumer Protection Act , Industrial sickness in India, Industrial Disputes, preventive measures for disputes.
Unit 5.	**Politico Legal Environment and Economic Environment**: Features of Indian economy, Main features of Economic Planning with respect to business, Planning in India, Industrial development in India. Industrial policy, small scale industries, competition policy and competition Act 2002.

Recommended book(s)

- Paul Justin (2010), Business Environment, 3rd edition, Tata McGraw Hill Education Pvt. Ltd.
- Upadhyay A.K (2010), Business Environment, 2nd edition ,Asian Books Pvt. Ltd.
- Bhatia , S.K (2010),Management by Values, Excel Books Pvt. Ltd.
- Cheunillum Francis, Business Environment, Himalayan Pubisher

Note for paper setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 10 long answer type questions, two from each unit. The students will be required to answer 05 questions, one from each unit, each question carries 10 marks.

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

Course Type: Multi-disciplinary Course **Course Code:** BBA-MD-304 **Course Title:** Leadership skills in Management **Credit: 03**	**University Examination- 45** **Internal Assessment-30** **Maximum Marks: 75**

Course Outcomes: On successful completion of the course, the students will be able

1. To improve speaking and listening skills in communication,
2. To learn about effective use of non verbal communication skills.
3. To develop social skills
4. To know about basic rules of business etiquette.

Unit 1.	**Introduction to Leadership;** Definition and significance of leadership, Distinction between leadership and management, Historical overview of leadership theories, Contemporary approaches to leadership, Trait theory of leadership, Behavioral theories of leadership, Situational and contingency theories, Transformational and transactional leadership, Authentic and servant leadership.
Unit 2.	**Personal Leadership Development:** Self-awareness and emotional intelligence, Values, ethics, and integrity in leadership Goal setting and self-motivation, Time management and personal productivity, Resilience and stress management, Rational and intuitive decision-making processes, Ethical decision making
Unit 3.	**Organizational culture and leadership,** Leadership styles and their influence on culture, Fostering a culture of innovation and learning, Leading organizational change, Managing resistance to change.
Unit 4.	**Team formation and Leadership,** Roles and responsibilities within teams, Establishing team norms and expectations, Managing conflicts within teams, Team performance evaluation and improvement.
: **Recommended book(s)**	Books: 1. Achua, Lussier, Effective Leadership ,CENGAGE . 2. A. Chandramohan, Leadership and Management, Himalaya . 3. Gary Yukl, Leadership in Organisation ,Pearson . 4. Peter G. Northhouse ,Introduction to Leadership, Concepts & practices,SAGE. 5. Afsaneh Nahavandi ,The Art & Science of Leadership ,Prentice Hall.

Note for paper setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 09 objective-cum-short answer type questions covering all four unit, each carrying 01 mark. **Section B** will contain 08 long answer type questions, two from each unit. The students will be required to answer 04 questions, one from each unit, each question carries 09 marks.

प्रबंधन अध्ययन विभाग
बाबा गुलाम शाह बादशाह विश्वविद्यालय
राजौरी

हिंदी का पाठ्यक्रम (बी . बी . ए. छमाही– तृतीय)
(एन ई पी के तहत)

पाठ्यक्रम प्रकार : क्षमता वृद्धि Ability Enhancement Course
पाठ्यक्रम कोड : बीबीए-एई-305 (BBA-AE-305)
पाठ्यक्रम शीर्षक : बुनियादी हिंदी पाठ्यक्रम (Basic Course in Hindi)
पाठ्यक्रम क्रेडिट : 03

विश्वविद्यालय परीक्षा : 45
आंतरिक मूल्यांकन : 30
अधिकतम अंक : 75

पाठ्यक्रम का उद्देश्य (Objectives):
इस पाठ्यक्रम को निम्नलिखित उद्देश्यों को पूरा करने के लिए तैयार किया गया है:

- छात्रों को हिंदी भाषा और उसके मूल व्याकरण से परिचित कराना।
- हिंदी पढ़ने, लिखने और बोलने के मामले में छात्रों को उनके कौशल विकसित करने में मदद करें।

पाठ्यक्रम के परिणाम (Outcomes):
सीओ-01: छात्र हिंदी वर्णमाला के सभी अक्षरों को पहचानने और उनका उच्चारण करने में सक्षम होंगे।
सीओ-02: छात्र बुनियादी व्याकरण अवधारणाओं का उपयोग करके हिंदी में सरल वाक्य बनाने में सक्षम होंगे।
सीओ-03: छात्र परिचित विषयों पर बुनियादी हिंदी वार्तालापों को समझने में सक्षम होंगे।
सीओ-04: छात्र परिचित विषयों पर सरल हिंदी पाठ पढ़ और लिख सकेंगे।
सीओ-05: विद्यार्थी अपने अनुभवों को हिन्दी में लिख सकेंगे।

पहली इकाई (Unit - 1)	❖ भाषा, लिपि, बोली और व्याकरण ***उपविषय :*** भाषा के दो प्रकार - मौखिक भाषा और लिखित भाषा, भाषा के अन्य रुप ; लिपि - वर्ण लिखने का ढ़ग ; व्याकरण की पहचान ❖ वर्ण विचार ***उपविषय :*** स्वरऔरव्यंजन ; दोनोंकेभेद ; शब्दों का शुद्ध उच्चारण ❖ शब्द विचार ***उपविषय :*** शब्दों के विभिन्न वर्गीकरण ; शब्द बनाने की प्रक्रिया
दूसरी इकाई (Unit - 2)	❖ संज्ञा, सर्वनाम, विशेषण ***उप विषय :*** तीनों विकारी शब्दों के भेद ❖ क्रिया, काल ***उप विषय :*** दोनों विषयों के भेद ❖ शुद्ध वाक्य रचना ***उप विषय :*** शब्द और वाक्य
तीसरी इकाई (Unit - 3)	❖ क्रिया विशेषण, समुच्चय बोधक अव्यय, संबंध बोधक अव्यय, विस्मयादिबोधक अव्यय, निपात। ***उप विषय :*** अधिकारी शब्दों के भेद ❖ वाक्य विचार ***उप विषय :*** अर्थ के आधार पर ; रचना के आधार पर ❖ विराम चिह्न ***उप विषय :*** चिह्नों की पहचान और प्रयोग

चौथी इकाई (Unit - 4)	❖ किसी भी विषय पर अनुच्छेद लेखन ❖ पत्र लेखन ❖ विज्ञापन लेखन ❖ अणुडाक / विपत्र (ई-मेल) लेखन (उपर्युक्त विषयों के प्रारूप समझना तथा विभिन्न विषयों पर लिखना)

चयनित संदर्भ / अनुशंसित पुस्तकें :

- खुद को हिंदी सिखाओ, एस.के. सक्सेना और एसपी तिवारी
- बेसिक हिंदी, राजीव रंजन, मिशिगन स्टेट यूनिवर्सिटी लाइब्रेरी, पूर्वी लांसिंग

भाषा सीखने की संचार प्रौद्योगिकी (वेबसाइटें):

- https://rajbhasha.gov.in
- हिंदी भाषा की जानकारी (http://hindilanguage.info/hindi-grammar/) (व्याकरण संरचनाओं का रूप, अर्थ और उपयोग; लिंक और बहुत कुछ)
- हिंदी स्क्रिप्ट ट्यूटर (http://www.avashy.com/hindiscripttutor.htm) (लेखन निर्देश, ध्वनियों की रिकॉर्डिंग, और परीक्षण।)
- नई दिशा नए लॉग (http://www.southasia.upenn.edu/hindi) ("नई दिशाएं, नए लोग": एनआरआई की भारत वापसी की वीडियो-आधारित कहानी। इसमें ऑडियो और धीमी गति वाला ऑडियो भी शामिल है।)
- आधुनिक हिंदी व्याकरण (http://koausa.org/iils/pdf/ModernHindiGrammar.pdf) (ओंकार कौल द्वारा, भारतीय भाषा अध्ययन संस्थान - पीडीएफ डाउनलोड करने के लिए लिंक)
- हिंदी में द्वार (http://taj.chass.ncsu.edu/) (एक ऑनलाइन हिंदी पाठ्यक्रम। इसमें लिपि और व्याकरण के साथ-साथ वीडियो पाठ भी शामिल हैं)
- http://www.shabdkosh.com/ (अंग्रेजी से हिंदी शब्दकोश के साथ-साथ हिंदी से अंग्रेजी शब्दकोश प्रदान करता है)

परीक्षा पत्र व्यवस्था के लिए टिप्पणी (Note for Paper Setting) :
प्रश्न पत्र दो खंडों में विभाजित होगा। ***खंड-ए*** अनिवार्य होगा और इसमें 09 वस्तुनिष्ठ सह लघु उत्तर प्रकार के प्रश्न होंगे, जिसमें संपूर्ण चार इकाइयाँ शामिल होंगी, प्रत्येक का 01 अंक होगा। ***खण्ड-ब*** में 08 दीर्घ उत्तरीय प्रश्न होंगे, प्रत्येक इकाई से दो। छात्रों को 04 प्रश्नों के उत्तर देने होंगे, प्रत्येक इकाई से एक, प्रत्येक प्रश्न 09 अंकों का होगा। 03 क्रेडिट पाठ्यक्रम के लिए कुल अंक 75 होंगे, जिसमें 30 अंक आंतरिक मूल्यांकन और 45 अंक विश्वविद्यालय परीक्षा के होंगे।

इस पाठ्यक्रम में शामिल होने के लिए पूर्वापेक्षाएँ (Pre-requisites for opting this course):
वे छात्र जिन्होंने 9वीं / 10वीं कक्षा तक हिंदी का अध्ययन किया है या जिन छात्रों को हिंदी भाषा को समझने और लिखने का बुनियादी ज्ञान है, उन्हें इस कोर्स का विकल्प चुनना चाहिए।

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

Course Type: Ability Enhancement course
Course Code: BBA- AE-306
Course Title: Basic Course in Urdu
Credit: 03

University Examination- 45
Internal Assessment-30
Maximum Marks: 75

Unit -I
اردو زبان تاریخی پس منظر
اردو قواعد
املا نویسی

Unit -II
نظم کی تعریف اور اس کا فروغ
نظیر اکبر ابادی کی نظم ادمی ثامہ کی مُتنی تدریس
چکبست کی نظم رامائن کا ایک سین کی متنی تدریس

Unit -III
غزل کی تعریف اور اس کا ارتقاء
مندرجہ ذیل شعرا کی منتخب غزلوں کی تشریح اور ادبی خصوصیات تہا
مستعار حسن سے اس کے حو نور تہا
آہ کو چاہیے اک عمر عصر ہونے تک

Unit-IV
افسانے کی تعریف اور اس کا ارتقاء
افسانہ کفن پریم چند ایک جائزہ
جوتہی کا جوڑا عصمت چغتائی ایک جائزہ

درسی کتب
تاریخ ادب اردو رام بابو سکسینہ
تاریخ ادب اردو نور الحسن نقوی
اردو املا رشید حسن خان
اردو کیسے لکھیں رشید حسن خان
انتخاب کلام میر مولوی عبدالحق
داستان سے افسانے تک وقار عظیم
اردو کی لسانی تشکیل شکیل الرحمن

Note for paper setting: The question paper will be divided into two sections. **Section A** will be compulsory and will contain 09 objective-cum-short answer type questions, covering all unit, each carrying 01 mark. **Section B** will contain 08 long answer type questions, two from each unit. The students will be required to answer 04 questions, one from each unit, each question carries 09 marks.

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri
BBA Semester -3rd

rse Type: Skill Enhancement Course | **University Examination- 30**
rse Code: BBA-SE-307 | **Internal Assessment-20**
rse Title: Creative Writing in Business | **Maximum Marks 50**
dit: 02

rse Outcomes: On successful completion of the course, the students will be able to

1. Explain the basic essence of creative writing in the contemporary business world.
2. Understand the process and techniques for effective creative writing.
3. Understand how to organize creative writing ideas.
4. Recognize basic structuring of paragraphs.
5. Adopt mechanisms for different kinds and formats of writings for business communication.

it 1	Creativity: Introduction and Characteristics of Creativity, features of creativity, Creative writing, various types of creative writing, Techniques used in creative writing, process of business writing, Writing Process in the Workplace, Applying the Communication Process, Imagination & Writing- Peer-interaction, Activities on Imagination, Craft of Writing- Figure of Speech, Word Play, Character Creation
nit 2	Organizing writing Ideas, Headings, Subheading and Lists, Writing Effective Paragraphs: Structuring a Paragraph, Organizing Within Paragraphs, Paragraph Transitions, Reverse Outlining: Creating a Reverse Outline, working with the Results of Reverse Outline, Proofreading & Editing: Proofreading & Editing of different types of writing, analysis, and interpretation of different works in Literature, Creative Writing & Media
Jnit 3	Writing Emails, Memos, Letters: Memos; Introduction and format for Memos, organizing memos, Style and Tone of writing memos, Common Memo Writing Situations, Business Letters; types of business letters, Elements of a business letter, samples of various types of business letters, Writing Business Emails; types of business emails, writing effective business emails, formats of various types of business emails, principles of writing instant messages

Recommended book(s)

1. Adelstein, Michael E. "Contemporary Business Writing" (1971) by New York, Random House Publications
2. Peter Hartley and Clive G. Bruckmann (2002), "Business Communication" by Routledge, London, UK
3. Andrews. P.H. and Herschel, R.T. (1996) Organizational Communication: Empowerment in a Technological Society. Boston, MA: Houghton Mifflin.
4. Angell. D. and Heslop, B. (1994) The Elements of E-mail Style. Reading, MA: Addison Wesley.
5. Bovee, C.L. and Thill, J.V. (1995) Business Communication Today, 4th edition. New York: McGraw-Hill.

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The Internal Assessment assessments for 2 credit course will be 20.

Department of Management Studies
Baba Ghulam Shah Badshah University, Rajouri

BBA Semester -3rd

Course Type: Value added Course | **University Examination- 30**
Course Code: BBA-VAC-308 | **Internal Assessment-20**
Course Title: Physical Education- Yoga | **Maximum Marks: 50**
Credit: 02

Course Objectives:

This course has been designed with the objective to make the students understand the basic principles of yoga, including the history, philosophy, physical postures and it's misconceptions.

Course Outcomes:

- *CO-1:* Students will be able to identify the different types of yoga and their benefits.
- *CO-2:* Students will be able to improve their flexibility, strength and balance.
- *CO-3:* Students will be able to reduce stress and anxiety by performing relevant yoga practices.
- *CO-4:* Students will be able to identify the relevance of healthy food habits.

Unit – 1	***Introduction to Yoga:*** Definition of Yoga, History of Yoga, Terminology of Yoga, Aims and Objectives of Yoga, Benefits of Yoga, Types / Streams of Yoga, Journey of Yoga from India to the World. Ashtang Yoga.
Unit - 2	***Yoga and Yoga Practices:*** Shatkarma - Meaning, Purpose, Procedure and their Significance in Yoga Sadhna ; Mudra and Bandha – Meaning, Procedure, Types, Precautions and Health Benefits ; Yogasanas - Meaning, Procedure, Principles, Types, Precautions and their Health Benefits ; Pranayama and Dhayana - Meaning, Procedure, Types, Precautions and their Health Benefits ; Yogic Management of Stress and its Consequences.
Unit – 3	***Yoga Philosophy on Diet and Health:*** Concept of Aahara (Diet) according to Yogic Text, Significance of Hath Yoga practices in Health promotion, Concept of mental health well-being according to Patanjali Yoga, Yogic practice of Patanjali Yoga, Importance of Subjective experience in daily Yoga Practice, Yoga in prevention of common disease – Obesity, Hypertension, Low Back Pain, Bronchial Asthma, Arthritis.

Recommended Book(s):

- Iyengar Yoga For Beginners, B.K.S. Iyengar, Penguin UK (3 August 2006)
- Patanjali's Yoga Sutras, Swami Vivekananda, Fingerprint! Publishing (1 October 2019)
- Yoga for Everyone: 50 Poses for Every Type of Body, Dianne Bondy, DK (10 June 2019)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 objective-cum-short answer type questions, two from each unit, each carrying 01 mark. **Section B** will contain 06 long answer type questions, two from each unit. The students will be required to answer 03 questions, one from each unit, each question carries 08 marks. The Internal Assessment assessments for 2 credit course will be 20.

BBA SEM -IV Exit Option (Diploma in Business Administration)						
	Course Code	**Title of the Course**	**University Examination**	**Internal Assessment**	**Total Marks**	**Credits**
Major Course	BBA –MJ-401	Human Resource Management	60	40	100	4
Major Course	BBA –MJ-402	Marketing Management	60	40	100	4
Major Course	BBA –MJ-403	Operation Management	60	40	100	4
Major Course	BBA –MJ-404	Management Accounting	60	40	100	4
Minor Course	BBA-MR-405	Entrepreneurship Development	60	40	100	4
Value Added Course	BBA – VAC-406	National Service Scheme	30	20	50	2
Total Credits						22

M. Sc. Microbiology Syllabus

(As per CBCS)

Revised-2022

Section of Microbiology

School of Biosciences and Biotechnology

Baba Ghulam Shah Badshah University,

Rajouri

Jammu and Kashmir

M. Sc. Microbiology Syllabus

Revised-2022

Summary of Credit distribution as per CBCS

SEMESTER	COURSES							
	CORE				ELECTIVE	FOUNDATION		Total Credits
	Theory	Practical	Seminar / Journal Club	Open Elective (OE)	Discipline Centric (DCE) (Theory)	Compulsory (CF)	Dissertation	
Semester-1	14	6				4		24
Semester-2	12	6	2	4				24
Semester-3	14	8			2			24
Semester-4	10	6			2		6	24
TOTAL								96

M. Sc. Microbiology Syllabus

List of papers along with Credit distribution and Marks as per CBCS

FIRST SEMESTER

PAPER					CREDITS	MARKS		
S. No.	Code	Title	Category	Duration [Hours]		Internal Assessment	University Examination	Total Marks
1	Mib-1041	Foundation Course	*Compulsory Foundation*	72	4	40	60	100
2	Mib-1042	General Microbiology	Core	72	4	40	60	100
3	Mib-1043	Virology, Mycology and Protozoology	Core	72	4	40	60	100
4	Mib-1021	Microbial Techniques	Core	36	2	20	30	50
5	Mib-1022	Cell Biology	Core	36	2	20	30	50
6	Mib-1023	Biomolecules	Core	36	2	20	30	50
7	Mib-1721	*Laboratory I: General Microbiology, Virology, Mycology and Parasitology*	*Core*	*72*	*2*	*25*	*25*	*50*
8	Mib-1722	*Laboratory II: Biomolecules and Cell Biology*	*Core*	*72*	*2*	*25*	*25*	*50*
9	Mib-1723	*Laboratory III: Microbial Techniques*	*Core*	*72*	*2*	*25*	*25*	*50*
Sub-total			Core	Theory	14	140	210	350
				Practical	*6*	*75*	*75*	*150*
			Foundation		4	40	60	100
TOTAL					**24**	**255**	**345**	**600**

SECOND SEMESTER

PAPER					CREDITS	MARKS		
S. No.	Code	Title	Category	Duration [Hours]		Internal Assessment	University Examination	Total Marks
1	Mib-2041	Molecular Biology and Microbial Genetics	Core	72	4	40	60	100
2	Mib-2042	Microbial Diversity	Core	72	4	40	60	100
3	Mib-2043	Enzymology and Metabolism	Core	72	4	40	60	100
4		*Open Elective (OE) opted by Microbiology students**	*Elective*	72	4	40	60	100
5	*Mib-2541*	*The Microbial World (Open Elective Course offered to students other than of Microbiology) #*	*Elective*	*72*	*4*	*40*	*60*	*100*
6	Mib-2621	Seminar/Journal Club (JC)	Core	36	2	50		50
7	Mib-2721	*Laboratory IV: Microbial Genetics and Molecular Biology*	*Core*	*72*	*2*	*25*	*25*	*50*
8	Mib-2722	*Laboratory V: Microbial Diversity*	*Core*	*72*	*2*	*25*	*25*	*50*
9	Mib-2723	*Laboratory VI: Enzymology and Metabolism*	*Core*	*72*	*2*	*25*	*25*	*50*
Sub-total			**Core**	Theory	12	120	180	300
				Practical	6	75	75	150
				Seminar/JC	2	50		50
			Elective (Open)		4	40	60	100
TOTAL					**24**	**285**	**315**	**600**

* **Open Elective Course:** Candidate has to opt 1 course out of 16 courses offered. The courses are separately listed.
\# For Students of discipline 'other than Microbiology'

THIRD SEMESTER

PAPER					CREDITS	MARKS		
S. No.	Code	Title	Category	Duration [Hours]		Internal Assessment	University Examination	Total Marks
1	Mib-3041	Immunology	Core	72	4	40	60	100
2	Mib-3042	Industrial Microbiology and Fermentation Technology	Core	72	4	40	60	100
3	Mib-3021	Microbial Ecology	Core	36	2	20	30	50
4	Mib-3022	Environmental Microbiology and Toxicology	Core	36	2	20	30	50
5	Mib-3023	Food Microbiology	Core	36	2	20	30	50
		Discipline Centric Elective (DCE)#	***Elective***	***36***	***2***	***20***	***30***	***50***
6	Mib-3521	Biofertilizers and Biopesticides#	***DCE***	36	2	20	30	50
7	Mib-3522	Analytical and Molecular Techniques#	***DCE***	36	2	20	30	50
8	Mib-3721	*Laboratory VII: Immunology*	*Core*	*72*	*2*	*25*	*25*	*50*
9	Mib-3722	*Laboratory VIII: Industrial Microbiology and Fermentation Technology*	*Core*	*72*	*2*	*25*	*25*	*50*
10	Mib-3723	*Laboratory IX: Environmental Microbiology, Toxicology*	*Core*	*72*	*2*	*25*	*25*	*50*
11	Mib-3724	*Laboratory X: Food Microbiology*	*Core*	*72*	*2*	*25*	*25*	*50*
Sub-total			Core	Theory	14	140	210	350
				Practical	8	*100*	*100*	200
			Elective (DCE) (Theory)		2	20	30	50
TOTAL					**24**	**260**	**340**	**600**

 # Discipline Centric Elective: Candidate has to opt 1 course out of 2 courses offered. The courses are separately listed.

THIRD SEMESTER

PAPER					CREDITS	MARKS		
S. No.	Code	Title	Category	Duration [Hours]		Internal Assessment	University Examination	Total Marks
1	Mib-3041	Immunology	Core	72	4	40	60	100
2	Mib-3042	Industrial Microbiology and Fermentation Technology	Core	72	4	40	60	100
3	Mib-3021	Microbial Ecology	Core	36	2	20	30	50
4	Mib-3022	Environmental Microbiology and Toxicology	Core	36	2	20	30	50
5	Mib-3023	Food Microbiology	Core	36	2	20	30	50
		Discipline Centric Elective (DCE)#	***Elective***	***36***	***2***	***20***	***30***	***50***
6	Mib-3521	Biofertilizers and Biopesticides#	***DCE***	36	2	20	30	50
7	Mib-3522	Analytical and Molecular Techniques#	***DCE***	36	2	20	30	50
8	Mib-3721	*Laboratory VII: Immunology*	*Core*	*72*	*2*	*25*	*25*	*50*
9	Mib-3722	*Laboratory VIII: Industrial Microbiology and Fermentation Technology*	*Core*	*72*	*2*	*25*	*25*	*50*
10	Mib-3723	*Laboratory IX: Environmental Microbiology, Toxicology*	*Core*	*72*	*2*	*25*	*25*	*50*
11	Mib-3724	*Laboratory X: Food Microbiology*	*Core*	*72*	*2*	*25*	*25*	*50*
Sub-total			Core	Theory	14	140	210	350
				Practical	8	100	100	200
			Elective (DCE) (Theory)		2	20	30	50
TOTAL					**24**	**260**	**340**	**600**

 # Discipline Centric Elective: Candidate has to opt 1 course out of 2 courses offered. The courses are separately listed.

FOURTH SEMESTER

PAPER								
S. No.	Code	Title	Category	Duration [Hours]	CREDITS	MARKS		
						Internal Assessment	University Examination	Total Marks
1	Mib-4041	Medical Microbiology	Core	72	4	40	60	100
2	Mib-4042	Agricultural Microbiology	Core	72	4	40	60	100
3	Mib-4021	Bioinformatics	Core	36	2	20	30	50
		Discipline Centric Elective (DCE)#	***Elective***	***36***	***2***	***20***	***30***	***50***
4	Mib-4521	Nanotechnology*	***DCE***	36	2	20	30	50
5	Mib-4522	Genetic Engineering#	***DCE***	36	2	20	30	50
6	Mib-4721	*Laboratory XI: Medical Microbiology*	*Core*	*72*	*2*	*25*	*25*	*50*
7	Mib-4722	*Laboratory XII: Agricultural Microbiology*	*Core*	*72*	*2*	*25*	*25*	*50*
8	Mib-4723	*Laboratory XII: Bioinformatics*	*Core*	*72*	*2*	*25*	*25*	*50*
9	MIB-4861	Dissertation/Review Paper	Core	288	6	150		150
		Sub-total	**Core**	Theory	10	100	150	250
				Practical	6	75	75	150
				Dissertation	6	150		150
			Elective (DCE) (Theory)		2	20	30	50
		TOTAL			**24**	**345**	**255**	**600**

 # Discipline Centric Elective: Candidate has to opt 1 course out of 2 courses offered. The courses are separately listed.

LIST OF OPEN ELECTIVES

SECOND SEMESTER			
S. No.	**Paper Code**	**Paper Title**	**Course Type**
1	Math-201	Mathematical Tools for Real World Problems	OE
2	IT-202	Soft Skills in Information Technology	OE
3	Comp-203	Computer Applications and Operations	OE
4	Bio-2541	Fundamentals of Biotechnology	OE
5	Bot-205	Mysteries of Green Plants	OE
6	Bot-206	Botany in Rural Development	OE
7	Zol-207	Nutrition, Health and Hygiene	OE
8	Arab-208	Fundamentals of Arabic Language	OE
9	Eng-209	Applied English	OE
10	Edu-210	Higher Education	OE
11	Eco-211	Principles of Banking	OE
12	HT-212	Basics of Tourism and Travel Agencies	OE
13	HT-213	Tourism Resources of J&K	OE
14	Mgt-214	Business Communication and Soft Skills	OE
15	Edu-215	Instructional Technology	OE
16	EVS-240	Environment and Social Issues	OE

THIRD SEMESTER			
S. No.	**Paper Code**	**Paper Title**	**Course Type**
1	Mib-3521	Biofertilizers and Biopesticides	DCE
2	Mib-3522	Analytical and Molecular Techniques	DCE

FOURTH SEMESTER			
S. No.	**Paper Code**	**Paper Title**	**Course Type**
1	Mib-4521	Nanotechnology	DCE
2	Mib-4522	Genetic Engineering	DCE

Program Outcomes (PO's) of M.Sc. Microbiology Program

PO1: ***Knowledge Acquisition***

Acquisition of knowledge of the subject to understand the basics and to cope with the advancement in the field.

PO2: ***Deeper Understanding***

To have a deeper understanding of the subject by the student enabling them to address societal and scientific issues.

PO3: ***Research and Development***

Development of scientific temperament and to prepare students for research and development in respective areas.

PO4: ***Problem Solution***

Development of critical thinking among students enabling them to solve problems by applying reasoning and technical inputs.

PO5: ***Evolution of new ideas***

Emergence of new ideas based on the acquired knowledge and critical thinking.

PO6: ***Environment and Sustainable Development***

Understanding the impact of development on the environment and its significance for the sustainable development.

PO7: ***Lifelong Learning***

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO8: ***Leadership and Self-reliance***

Development of leadership abilities among the students to lead and excel in their respective fields. Also, the training provided will also make the students self-reliant.

Program Specific Outcomes (PSO's) of M.Sc. Microbiology Program

PSO1: Refurbishing the basics of Physics, Chemistry, Biology, Computers and Biostatistics for better understanding of the rest of the syllabus.

PSO2: General understanding about various microbes, mainly bacteria, their growth and control.

PSO3: Development of understanding about viruses, fungi and protozoa.

PSO4: Development of understanding about various techniques employed in studying and manipulating microbes.

PSO5: Development of understanding in the area of Cell Biology (glance of cell structure, function, cell cycle and cell signaling).

PSO6: Development of understanding about various biomolecules.

PSO7: Development of understanding in the area of Molecular Biology and Microbial Genetics (glace gene structure, replication, transcription, translation, regulation of gene expression, genetic variation and inheritance).

PSO8: Development of understanding about the diversity of microbial world.

PSO9: Understanding about the biological catalysts, enzymes, and the cellular metabolism.

PSO10: Development of Scientific oratory skills through seminar presentations.

PSO11: Development of the understanding about the Immune System, an essential component of host-microbe relation.

PSO12: Development of understanding about the microbial ecology, Role of microbes in the environment and pollution.

PSO13: Development of understanding about the role of microbes in the development of food and dairy products as well as their spoilage.

PSO14: Development of understanding of fermentation technology utilizing various microbes for the production of Alcohol, Antibiotics and other organic compounds.

PSO15: Development of understanding about the role of microbes in causing infections and diseases in humans.

PSO16: Development of understanding about the role of microbes in Agriculture, including nutrient recycling, plant diseases and storage of agricultural products.

SEMESTER I

Course Code: Mib-1041 | **Total Marks: 100**

Course Title: Foundation Course | **Internal Assessment: 40**

Credits: 04 | **External Examination: 60**

Duration of Course: 72 Hours | **Duration of Exam: 03 Hours**

Course Objectives: *The objective of this course to impart fundamental knowledge about the physical, chemical and biological basis of life and familiarize students with the practical aspects of computer systems and biostatistical analysis.*

Unit – 1 Cellular Foundations

1.1 The Origin of Life: Chemical evolution of biomolecules; RNA world: First gene and Catalyst; Biological evolution; Evolution of initial eukaryotic cells.

1.2 Cells as structural and functional units of life. The three domains of life: Bacteria, Archaea and Eukarya. Typical and distinguishing features of Bacteria and Archaea.

1.3 Eukaryotic Cells: Membrane, Cytoplasm and Organelles; Photosynthetic Plant Cells and Animal Cells: Common and distinguishing features. Unicellular and Multicellular organisms.

1.4 Genetic Information and its storage: Concept of gene and genome; Flow of genetic information.

Unit – 2 Chemical and Physical Foundations

2.1 Chemical Elements, Atoms and Molecules; Molecular interactions: Strong Interactions (Covalent, Coordinate covalent, Ionic and Metallic bonds), Weak interactions (Hydrogen bonding, Salt bridge, Vander Waal Interaction and Hydrophobic Interactions).

2.2 Stereochemistry: Definition, Classification of Isomerism in Organic compounds: Structural isomerism, Stereoisomerism – geometrical and optical isomerism.

2.3 Laws of thermodynamics; Free energy change (ΔG); Relationship between free energy change and equilibrium constant; Exergonic and Endergonic reactions; Coupled reactions and addition of ΔG.

2.4 Enthalpy and Entropy and its relation with free energy change. Redox reactions: redox potential and its relation to free energy change.

Unit – 3. Introduction to computer and its applications

3.1 Computer Fundamentals and Organization: Central Processing Unit-Control Unit, Arithmetic Unit, Instruction Set, Register, Processor Speed, Memory Units, Storage Evolution Criteria, Memory Organization, Capacity, RAM, ROM, Secondary Storage.

3.2 Operating systems and data base management system: Introduction to MS-Office, MS-Word, and MS-Excel, Statistical Data analysis through MS-Excel, Storage of data, filing, retrieving, and reproduction.

3.3 Application of computers in current biological research: Internet: definition and practical utility; Introduction of digital computers.

3.4 Computer programming: Data types: Constants, variables, expressions, operations, functions, flow charts, commands, simple programs and their execution- scope and limitations.

Unit – 4. Introduction to Biostatistics

4.1 Concepts of statistical population and sample from a population; qualitative and quantitative data; discrete and continuous data; Primary data; designing a questionnaire and a schedule; secondary data and sources of secondary data.

4.2 Presentation of data: Diagrammatic and graphical representation of data; frequency distributions and cumulative frequency distributions; histogram and frequency polygon. Descriptive statistics: concepts of central tendency.

4.3 Brief description and tabulation of data and its graphical representation: Measures of central tendency and dispersion - mean, median, mode, range, standard deviation, variance.

4.4 Introduction to probability and laws of probability: Random Events, Events- exhaustive, mutually exclusive and equally likely (with simple exercises)

Unit – 5. Application of Biostatistics

5.1 Tests of significance: T-test, F-test and χ^2 test.

5.2 Binomial, Poisson and Normal distribution; Deviation, properties and applications of normal distribution.

5.3 Correlation: types, methods; Karl Pearson's coefficient and regression (linear) analysis and their uses.

5.4 Principles of experimental designs: Completely Randomised Designs (CRD) and Randomised Block Designs (RBD)

Course outcome:

1. To familiarize students with the basics of physical, chemical and cellular foundations of life.
2. Generalized introduction about cell, its components and flow of genetic information.
3. Introduction to the fundamentals of Computers, its applications and development of understanding about the usage of various operating systems and data bases in biological research.
4. General understanding about the concepts of Biostatistics, Data presentation and its application in biosciences.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. E. H. Segel. *Biochemical Calculations: How to Solve Mathematical Problems in GeneralBiochemistry*, 2nd Edition, John Wiley Publications.
2. Nelson, D. D. L., Lehninger, A. L. and Cox, M. M. (2013). *Lehninger: Principles of Biochemistry*. W.H. Freeman Publishers.
3. Tanford, C. (1961). *Physical Chemistry of Macromolecules*. John Wiley and Sons.

4. Voet, D., &Voet, J. G. (2016). *Biochemistry* (5th ed.). Hoboken, NJ: J. Wiley & Sons.
5. Sinha, P.K. and Sinha, P. (2005). Computer Fundamentals. BPB Publication.
6. Rajaraman, V. (2004). Fundamentals of Computers. Prentice-Hall of India Pvt. Ltd., New Delhi.
7. Jaype Brothers, (2011), Methods in Biostatistics for Medical Students and Research Workers (English), 7th Edition.
8. Norman T.J. Bailey, (1995), Statistical Methods in Biology, 3rd Edition, Cambridge University Press.
9. P. N. Arora and P. K. Malhan, (2006), Biostatistics, 2nd Edition, Himalaya Publishing House.
10. Jerold Zar, Biostatistical Analysis, 4th Edition. Pearson Education.
11. Biostatistics: A Foundation for Analysis in the Health Sciences, 7th Ed. Wiley and sons.

SEMESTER I

Course Code: Mib-1042
Course Title: General Microbiology
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

Course Objectives: *The objective of this course is to introduce students to the basics of general microbiology and to provide in-depth knowledge about the genesis, diversity and sustenance of microbial world.*

Unit – 1 Introduction to Microbiology

1.1 Introduction, history and scope of microbiology. Discovery of microscope and microbes, Theory of abiogenesis & biogenesis, Koch's postulates, River's postulate, concept of kingdom- prokaryote and eukaryotes.

1.2 General characteristics and composition of Prokaryotes and Eukaryotes.

1.3 Classification of Microorganisms: Haekel's three kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese, classification and salient features of bacteria according to Berger's Manual of Determinative Bacteriology.

1.4 Nomenclature and modern methods of Bacterial taxonomy.

Unit – 2 Prokaryotic Cell Structure and Function

2.1 An overview of prokaryotic cell structure; Morphology and ultrastructure of bacteria: size, shape, and arrangement of bacteria, ultra-structure of eubacteria and archeabacteria. Protoplast and spheroplast formation.

2.2 Components external to cell wall: Structure and function of flagella, fimbriae and pilli, capsule- types, composition and function, slime layers, S-layers.

2.3 Prokaryotic cell membrane and cytoplasmic matrix – cell membrane structure and function of bacteria and archeabacteria, mesosomes, ribosomes, cytoplasmic inclusion bodies (polyhydroxy butyrate, polyphosphate granules, oil droplets, cyanophycin granules) and Prokaryotic genome.

2.4 Protein secretion in prokaryotes; Microbial response to external stimulus: Chemotaxis and phototaxis; formation and germination of bacterial endospore.

Unit – 3 Microbial Nutrition and Growth

3.1 Microbial nutrition: Basic nutritional requirements, growth factors, nutritional categories, physical requirements of bacterial growth.

3.2 Microbial media: types (complex, synthetic, differential, enrichment and selective media) and their uses, culture characteristics of bacteria on different media.

3.3 Cultivation of microbes: aerobic and anaerobic culture, pure culture techniques, shaker and still culture, maintenance and preservation of microbial culture.

3.4 Microbial growth: growth kinetics, growth curve. Batch, continuous and synchronous culture. Measurement of growth and influence of environmental factors affecting growth

Unit – 4 Control of Microorganisms by Physical and Chemical Agents

4.1 Control of microorganisms: Microbial death curve, concept of bio-burden, thermal death time and decimal reduction time. Factors influencing the effectiveness of antimicrobial agents.

4.2 Control of microorganisms by physical agents: heat (moist and dry), filtration and radiation.

4.3 Chemical control of microorganisms: Halogens, phenol and other phenolic compounds, heavy metals, alcohols, ethylene oxide and aldehydes.

4.4 Antibiotics: classification, mode of action and development of antibiotic resistance in bacteria.

Unit – 5 General features of Fungi, Viruses and Acellular infectious agents

5.1 General morphological, cultural and biochemical properties of *Chlamydia, Rickettsia, Mycoplasma* and *Actinomycetes.*

5.2 Fungi - Distinguished characteristics of fungi, general account on morphology, reproduction, physiology and classification.

5.3 Viruses - General properties, morphology and reproduction mechanisms of viruses. General characteristic features of plant, animal and bacterial viruses.

5.4 Acellular Infectious agents: Viroid, Virusoids and Prions.

Course outcome:

1. General introduction to the history and scope of microbiology, microbial classification and nomenclature.
2. To acquaint students with the concepts of cellular classification (prokaryotes and Eukaryotes), their structure and function.
3. To provide a detailed understanding about infectious agents (cellular and acellular).
4. Development of understanding among the students about bacterial growth and control methods

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, Mc Graw Hill Higher education.
2. Alcomo, I.E. 2001. *Fundamentals of Microbiology.* VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.
3. R.Y. Ingraham, J.L. Wheels, M.L. Painter. *General Microbiology;* Thess Macmillan Press Ltd.
4. M.T, Martinko, J.M. Parker, *Brock Biology of Microorganism*; Prentice-Hall.
5. M.J. Pelczar, E.C.S Chan and N.R. Kreig, *Microbiology;* Tata MacGraw Hill
6. Breed and Buchanan. *Bergey's Manual of Systematic Bacteriology.* 2nd Edition, (Volumes. 1 – 5) (2001 – 2003).
7. R. Y. Stanier, E. A. Adelberg, J. L. Ingraham, *General Microbiology,* 4th edition, Mac Millan Press, London.

SEMESTER I

Course Code: Mib-1043

Course Title: Virology, Mycology and Protozoology

Credits: 04

Duration of Course: 72 Hours

Total Marks: 100

Internal Assessment: 40

External Examination: 60

Duration of Exam: 03 Hours

Course Objectives: *The objective of this course is to introduce students to the various domains of the microbial world and to impart in-depth knowledge about structure & functions of Viruses, Fungi & Protozoa.*

Unit – 1 The Viruses: Introduction and General Characteristics

1.1 Brief outline of discovery and origin of viruses; General properties of viruses.

1.2 Structure of viruses, size, capsid and their arrangements, viral envelopes and enzymes, viral genome and their types.

1.3 Viral reproduction; Cultivation of viruses; Purification of viruses and Virus Assays.

1.4 Classification and general properties of major families of viruses including detail account of their mode of replication.

Unit – 2 Viruses of Bacteria and Archaea

2.1 Bacterial and Archaeal viruses: Classification, morphology and ultra-structure.

2.2 Virulent double stranded DNA phages: One step growth (latent period, eclipse period, and burst of size).

2.3 Life cycle: lytic and lysogenic life cycle of bacteriophages.

2.4 Single stranded DNA phage, RNA phage; Brief account of M13, Mu, T4, φx174 and lambda phage.

Unit – 3 Eukaryotic Viruses

3.1 Taxonomy of Eukaryotic Viruses.

3.2 Reproduction of vertebrate viruses: Adsorption of virions, Penetration and Uncoating, Genome replication and transcription in DNA and RNA viruses and protein synthesis, Assembly of virus capsids and virion release.

3.3 Cytocidal Infections and cell damage; Persistent, latent and slow virus infections; Virus and Cancer.

3.4 Plant viruses and their classification: Structure and pathogenicity of TMV: Viruses of Fungi, Protist and Insects.

Unit – 4 Fungi

4.1 Structure, reproduction and classification of fungi, general characteristics of Zygomycetes, Ascomycetes, Basidiomycetes, and Deuteromycetes.

4.2 Cultivation of fungi, culture media for fungal growth, effects of environment on growth, isolation, identification and preservation of fungi.

4.3 Dimorphic fungi, yeast morphology, general characteristics and reproduction. Lichens, Mycorrhiza, and Actinomycetes.

4.4 Ecology of fungi: concept of fungistatic, fungicidal.

Unit – 5 Protozoa

5.1 Occurrence and Ecology of Protozoa: Free-living, symbiotic and parasitic protozoa.

5.2 Importance and Morphology of protozoa: Intracellular structures and locomotors organelles.

5.3 Reproduction of Protozoa: Asexual and Sexual Reproduction; Regeneration.

5.4 Classification of protozoa; Characteristics of some major groups of Protozoa: Flagellates, Amoebas, Sporozoa and the ciliates.

Course outcome:

1. General introduction to the students about viruses, Fungi and Protozoa.
2. Development of Understanding about the classification &morphology bacterial, archaeal and eukaryotic viruses.
3. Generalized idea about Fungi, classification and ecology.
4. General understanding about protozoa, Morphology, importance and characteristics of some major groups.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, Mc Graw Hill Higher education.

2. Alcomo, I.E. 2001. *Fundamentals of Microbiology.* VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.

3. M.J. Pelczar, E.C.S Chan and N.R. Kreig, *Microbiology;* Tata MacGraw Hill.

4. Renato Dulbecco and Harold S. Ginsberg, *Virology;* Fourth edition, J.B. Lippincott Company, USA

5. S. B. Biswas and Amita Biswas. *An Introduction to viruses,* Fourth edition, Vikas Publishing House Pvt Ltd New Delhi.

6. Ananthnarayanan and Paniker's, *Textbook of Microbiology,* eighth edition, Universities Press.

7. Alexopoulos, C. Jr, *Introductory Mycology,* Second edition, Wiley, New York.

SEMESTER I

Course Code: Mib-1021
Course Title: Microbial Techniques
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to acquaint students with the practical aspects of microbiology and familiarize students with the requisite techniques of isolation, cultivation, maintenance and identification of microbes.*

Unit – 1 Microscopy

1.1 Microscopy: Light microscopy- Simple, Compound and Stereomicroscopy.

1.2 Electron microscopy: Principles, construction and mode of operation of Scanning and Transmission electron microscopy

1.3 Preparation of specimens for electron microscopic studies.

1.4 Confocal microscope: Principle, working and applications; other advanced techniques in microscopy.

Unit – 2 Staining Techniques, Culturing and Sterilization

2.1 Microbiological stains and staining techniques: Types of stains and principles of staining; Stains for bacteria, fungi, algae and protozoa, spirochetes, stains for mycoplasma.

2.2 Preparation of bacterial smears for light microscopy: Fixation, simple staining; Differential staining, Structural staining (Capsule, Flagella, Cell wall and Endospore of bacteria), and nuclear staining.

2.3 Culture media for Microbes; Types of media- general-purpose media, special purpose media; selective, elective, diagnostic, resuscitation media; Pure culture techniques: Different types of inoculation techniques - Spread plate, Pour plate and Streak plate methods.

2.4 Sterilization techniques: Principles, types of Sterilization, and their mode of action, Physical methods: Heat-dry heat, Incineration, Moist heat, Tyndalization (Fractional Sterilization), Radiation methods; Filtration-Types of filters, Working of Laminar airflow.

Unit – 3 Basic Molecular Techniques

3.1 Host and vectors: Microbial host for cloning and expression; bacteria, fungi as hosts; Vectors for cloning and expression based on plasmids, phagemids, cosmids, bacterial and yeast artificial chromosomes.

3.2 Tools employed in molecular cloning: Plasmid purification; Restriction endonucleases, types, cleavage pattern; Sticky and blunt ends; DNA ligases; DNA polymerases; DNA modifying enzymes commonly used in cloning.

3.3 PCR; Principle, types and variations; Applications of PCR; Site directed and random mutagenesis; cDNA cloning; DNA sequencing: Maxam Gilbert method; Sanger's method, Next generation sequencing techniques.

3.4 Microbes for protein overexpression: Uses of different microbes (bacteria and fungi) for protein overexpression.

Course Outcome

1. Development of understanding about various techniques employed in studying and manipulating microbes.
2. Development of understanding about techniques regarding isolation and identification of microbes.
3. Generalized understanding about sterilization and culture media.
4. Introducing students to the concepts of cloning and expression.

Note for the Paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 08 marks.

Recommended Textbooks and References:

1. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.

2. Pelczar, (Jr.) M. J., Chan, E. C. S. and Kreig, N. R.1993. *Microbiology.* McGraw Hill, New York

3. Presscott, L. M. Harley, J. P. and Klein, D. A. 1999. *Microbiology*, International edn. 4th edn. WCB Mc Graw-Hill.

4. Cappuccino, J. G. and Sherman, N. 1999. *MICROBIOLOGY A Laboratory Manual* 4th Edn. Addison– Wesley.

5. Madigan M.T., Martinko M. J. and Parker, J. 2003. *Brock Biology of microorganisms.* Pearson education, New Jersy.

6. Brown, T. A (2010) *Gene cloning and DNA Analysis: An Introduction*, Wiley-Blackwell Publication

7. Clark, D. P (2005). *Molecular Biology: Understanding the Genetic Revolution.* Academic press

8. Bernard R. Glick, Jack J. Pasternak, Cheryl L. Pattten. 2010. *Molecular Biotechnology: Principles and Applications of Recombinant DNA.* 4th Ed. ASM press.

SEMESTER I

Course Code: Mib-1022
Course Title: Cell Biology
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to provide in-depth knowledge about the structural and functional aspects of cell and familiarize students with the concepts of cellular communication and division.*

Unit – 1 Structure of Cells and Its Organelle

1.1 Structure and diversity of prokaryotic and eukaryotic cells; characteristics that distinguish prokaryotic and eukaryotic cells. An outline of their ultra-structure.

1.2 Subcellular fractionation: concept, principle and isolation of plasma membrane, nuclei, mitochondria, microsomes and cytosol, applicability of the technique in contemporary researches in cell biology. Chemical organization of the cell- a general account.

1.3 Structure and functions of mitochondria, Golgi complex, vacuoles, lysosomes, microbodies, nuclear envelope and nucleolus.

1.4 Cytoskeleton: structure, composition and functions of microtubules, microfilaments, cilia and flagella.

Unit – 2 Cell Membrane: Structure and Functions

2.1 Basic structural elements of membrane- lipid bilayer, micelles and vesicles; Characteristics and composition of cell membrane; membrane turnover.

2.2 Membrane structure and assembly: fluid mosaic model; membrane proteins- integral, peripheral and lipid anchored; membrane lipids- structure and asymmetry.

2.3 Membrane dynamics: ordering of acyl group in bilayer; Trans bilayer movement of lipids- catalyzed and uncatalyzed movement.

2.4 Membrane transport: passive mediated- ionophores, porins, ion channels, aquaporins; active transport- Na^{+}-K^{+} ATPase, Ca^{2+} ATPase, and ABC transporters.

Unit – 3 Cell Cycle and Signaling

3.1 Signal transduction: General features, role of effector proteins and secondary messengers in signaling, structure of G-protein coupled receptors (GPCR), trimeric G-protein; classes and functions.

3.2 Signaling pathway that regulate ion channels: Rhodopsin signaling pathway in Rod cells of the eye. Gene controlling signaling pathways: tyrosine kinase pathway and Ras/MAP kinase pathway.

3.3 Cell cycle: mitosis, meiosis (general account); control of cell cycle, role of kinases and kinase inhibitors, checkpoints: concept and role.

3.4 Programmed cell death (Apoptosis) - pathways involved, role in normal and diseased state, various markers of apoptosis. Role of FAS ligand.

Course outcome

1. Development of understanding about Cell Biology (cellular structure, diversity and classification).
2. Making students understand about the composition of Cell and function of varied cellular organelles.
3. To develop thorough understanding of cellular membrane, membrane dynamics and its role in transport and cellular structure.
4. To provide a detailed lesson about cell signaling, messengers, receptor molecules and its role in apoptosis.

Note for the Paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 08 marks.

Recommended Textbooks and References:

1. Albert B; Bray D; Raff M; Roberts K and Watson JD. (2004). *Molecular Biology of the Cell*, Garland Publishing Inc., New York. 6th Ed.

2. Cooper, G. M. and Hausman R.E. (2006). *The Cell: A Molecular Approach*, ASM Press, Washington DC. 4th Ed.
3. Evans, J. and Manson, A. L. (2008). *Cell Biology and Genetics*. Mosby Publishers.
4. Karp, G. (2007). *Cell and Molecular Biology*, John Wiley and Sons Inc. 5th Ed.
5. Kleinsmith L. J. and Kish V. M. (1995). *Principles of Cell and Molecular Biology*, Harper Collins College Publishers, New York, USA. 2nd Ed.
6. Lodish H; Berk A; ZipurskySl; Matsudaira P; Baltimore D and Darnell J. (2004). *Molecular Cell Biology*, W. H. Freeman and Company, 5th Ed
7. Nelson, D. D. L., Lehninger, A. L. and Cox, M. M. (2013). *Lehninger Principles of Biochemistry*. W.H. Freeman Publishers.
8. Sako, Yasushi, Ueda, Masahiro (Eds.) (2011). *Cell Signaling Reactions*. Springer.

2. Cooper, G. M. and Hausman R.E. (2006). *The Cell: A Molecular Approach*, ASM Press, Washington DC. 4th Ed.
3. Evans, J. and Manson, A. L. (2008). *Cell Biology and Genetics*. Mosby Publishers.
4. Karp, G. (2007). *Cell and Molecular Biology*, John Wiley and Sons Inc. 5th Ed.
5. Kleinsmith L. J. and Kish V. M. (1995). *Principles of Cell and Molecular Biology*, Harper Collins College Publishers, New York, USA. 2nd Ed.
6. Lodish H; Berk A; ZipurskySl; Matsudaira P; Baltimore D and Darnell J. (2004). *Molecular Cell Biology*, W. H. Freeman and Company, 5th Ed
7. Nelson, D. D. L., Lehninger, A. L. and Cox, M. M. (2013). *Lehninger Principles of Biochemistry*. W.H. Freeman Publishers.
8. Sako, Yasushi, Ueda, Masahiro (Eds.) (2011). *Cell Signaling Reactions*. Springer.

SEMESTER I

Course Code: Mib-1023
Course Title: Biomolecules
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of the course is to familiarize students with the structure-function relationship of biomolecules and their importance with regard to maintenance and perpetuation of the living systems*

Unit-1 Introduction to Biomolecules and Proteins

1.1 Water: structure and properties, ion product, dipolar structure and dielectric constant; Concentration of solution- Molarity, Normality, Molality and Strength.

1.2 Chemical foundations of biology: pH, pK, acids, bases, buffers- composition, preparation, Henderson-Hasselbalch, buffer capacity and strength.

1.3 Amino acids: structure and classification; Proteins: characteristics of peptide bond and Ramachandran map; Hierarchy in structure: primary, secondary, tertiary and quaternary structures.

1.4 Protein folding- Anfinsen's experiment, Levinthal paradox, chaperons, protein sequencing (N-terminal sequencing, C-terminal sequencing, Edman degradation).

Unit – 2 Carbohydrates and Lipids

2.1 Carbohydrates: classification, basic chemical structure, monosaccharaides– aldoses and ketoses; Configuration and conformation of monosaccharaides (pyranose and furanose), stereoisomerism, anomers, epimers and mutarotation

2.2 Polysaccharides: structural polysaccharides - cellulose and chitin; storage polysaccharides- starch and glycogen; glycoproteins: N- and O-glycosylation; Glycosaminoglycan; Glycoproteins

2.3 Lipids – classification of lipids: oils, fats, and waxes, occurrence and properties of fatty acids, esters of fatty acids, phospholipids, glycolipids, sphingolipids, cerebrosides and gangliosides.

2.4 Lipoproteins, steroids and cholesterol; Eicosanoids, prostaglandins and leukotrienes.

Unit – 3 Nucleic acids, Vitamins and Pigments

3.1 Nucleic acids: purines, pyrimidines, nucleosides, nucleotides: structure of DNA and RNA.

3.2 Vitamins and Co-enzymes: classification, water-soluble and fat-soluble vitamins, dietary requirements, deficiency conditions, coenzyme forms.

3.3 Porphyrins and porphyrin ring system: chlorophyll, hemoglobin and myoglobin.

3.4 Secondary metabolites: isoprenoids, polyphenols and flavonoids

Course Outcome

1. Development of understanding about biomolecules (Carbohydrates, Proteins, Lipids, Vitamins & Pigments).
2. Detailed understanding of structure, classification and biological functions of various biomolecules.
3. Acquainting students with structure and biological functions of various pigments and secondary metabolites.
4. To develop a thorough understanding about the solubility of various biomolecules and its relation with their chemical structures.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Stryer, L. (2015). *Biochemistry* (8th ed.). New York: Freeman.
2. Lehninger, A. L. (2012). *Principles of Biochemistry* (6th ed.). New York, NY: Worth.

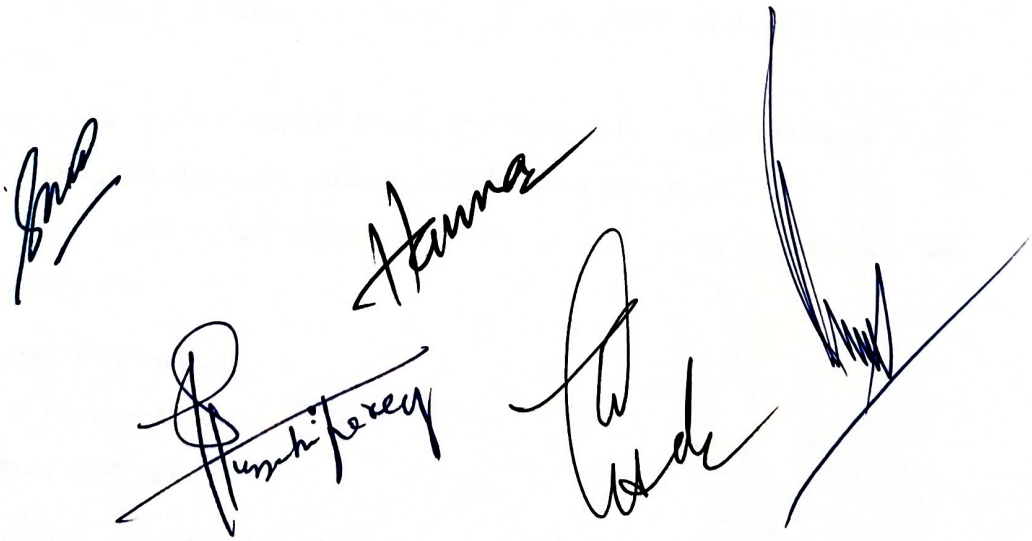
3. Voet, D., & Voet, J. G. (2016). *Biochemistry* (5th ed.). Hoboken, NJ: J. Wiley & Sons.

4. *Biochemistry* by Geoffrey L. Zubay. Fourth Edition, Addison-Wesley educational publishers Inc., 2008

5. Horton, H.R., Moran, L. A., Scrimgeour, K.G. Perry, M.D and Rawn, J.D. 2006. *Principles of Biochemistry*, IVth Edition. Pearson Education Internationl. London.

6. Dobson, C. M. (2003). *Protein Folding and Misfolding.* Nature, 426(6968), 884-890. doi: 10.1038/nature02261.

7. Richards, F. M. (1991). *The Protein Folding Problem.* Scientific American, 264(1), 54-63. doi: 10.1038/scientificamerican0191-54.



SEMESTER I

Course Code: Mib-1721 **Total Marks: 50**

Course Title: Laboratory I: General Microbiology, Virology, Mycology and Parasitology

Internal Assessment: 25 **Credits:**

02 **External Examination: 25**

Duration of Course: 72 Hours

Course Outcome: *The objective of this laboratory course is to introduce students to the Do's & Don'ts of microbiology laboratory and to further impart practical knowledge and requisite skills for isolation, maintenance, preservation & identification of microorganisms.*

General Microbiology, Virology, Mycology and Parasitology

1. Good Microbiology laboratory practices: Laboratory safety (Do's and Don'ts), hazard from chemicals, handling of cultures and chemicals, disposal of chemicals and cultures.
2. Introduction to different Glassware used in Microbiology Laboratory.
3. To learn handling of different instruments and Equipment used for culture and Sterilization.
4. To prepare basic liquid (Nutrient broth) and basic solid media (Nutrient Agar and Potato Dextrose Agar) for cultivation of bacteria and fungi.
5. To learn pure culture techniques used for isolation and purification of microorganisms by:
    a. Streak plate method.
    b. Pour plate method.
    c. Spread plate method.
6. Isolation and Enumeration of microorganisms from Air (plate exposure method), Soil and Water (serial dilution method).
7. Gram staining of bacteria
8. Isolation of bacteriophage (coli phages) from sewage.
9. Enumeration of bacteriophage by plague forming unit method.
10. Determination of one step growth curve of bacteriophage.
11. Isolation cultivation and morphological studies of fungi.

12. Isolation cultivation and morphological studies of *Actinomycetes.*
13. Isolation and observation of protozoa under microscope

Course Outcomes

1. The objectives of this laboratory course is to provide the practical's skills for handling cultures and various glass wares used in Microbiology laboratory.
2. The students will be able to perform the basic techniques related to screening, isolation and cultivation of microorganisms from various sources.
3. The students will be able to study the microorganism with regard to morphology, cultural and biochemical characters.
4. The course will help the students in understanding the techniques used to classify the microbes to certain extent.

SEMESTER I

Course Code: Mib-1722

Course Title: Laboratory II: Biomolecules and Cell Biology

Credits: 02

Duration of Course: 72 Hours

Total Marks: 50

Internal Assessment: 25

External Examination: 25

Course Objectives: *The course aims to develop skills of performing basic biochemical tests important in clinical investigations, to develop familiarity with biochemical laboratory techniques and to introduce students to various practical aspects in cell biology.*

Biomolecules

1. Preparing various stock solutions and working solutions that will be needed for the course.
2. To prepare an Acetic-Na Acetate Buffer and validate the Henderson-Hasselbach equation.
3. Overview of Spectrophotometer and validating the Beer- Lambert's Law.
4. To detect the presence of carbohydrate in the given sample by Molish test.
5. To detect the presence of reducing sugar in the given sample by Fehling's test
6. To detect presence of reducing sugar using Benedict's test.
7. To determine the presence of starch in given sample by using iodine solution (starch- iodine test).
8. Tests for amino acids: Ninhydrin test, Xanthoproteic test, Lead sulphide test, Hopkin'test.
9. To determine Saponification value of given fat sample.
10. Separation of amino acids by Paper Chromatography/TLC
11. Separation of plant pigments by Paper Chromatography/TLC

Cell Biology

1. Lab demonstration of light and fluorescence microscopic techniques.
2. Study the process of somatic cell division in root tips of *Allium sativum*(garlic)/*Allium cepa* (onion)/*Aillumtuberosum.*
3. Study the structure of somatic chromosomes of *Allium cepa/ Viceafaba,* describe the salient features of the karyotype and preparation of ideogram.

4. Study meiotic behaviour of chromosomes of *Phlox drumondii, Allium sp or Eremurus sp.*
5. Lab demonstration of microtomy technique.
6. Preparation of plant and animal tissue sections for microtomy and their staining.
7. Isolate chloroplasts from leaf tissues of spinach; study the variation in chloroplast shape in spinach, *Ulothrix* and *Spirogyra.*
8. Study the diversity in cell structure in a given sample of plant and animal tissue. (Onion peel, pulp of banana, xylem cells, liver of sheep)
9. Study transport across the semi permeable membrane by using potato osmoscope.

*Depending upon the availability, only one material will be used.

Course Outcomes

1. To train the students to perform the quantitative/ qualitative analysis of Biomolecules and understand various biochemical pathways.
2. Instil the intellectual skills to analyse the molecules using advance biophysical techniques such as Paper chromatography/TLC etc.
3. To train students with the basics of Solution and Buffer preparation.
4. This course provides hands on training to students regarding working and handling of instruments

SEMESTER I

Course Code: Mib-1723

Course Title: Laboratory-III Microbial Techniques

Credits: 02

Duration of Course: 72 Hours

Total Marks: 50

Internal Assessment: 25

External Examination: 25

Course Outcome: *The objective of this laboratory course is to provide practical skills in the isolation and establishment of pure microbial cultures and to familiarize students with the molecular techniques of microbe characterization.*

Microbial Techniques

1. Lab demonstration of light microscopic technique.
2. Isolation of pure microbial culture from soil/water/human sample by streak plate method.
3. Culturing of microbes on small and medium scale.
4. To perform different staining methods to study morphological and structural characteristics of bacteria and fungi.
    a. Gram Staining.
    b. Acid fast staining.
    c. Fungal staining (Lacto-phenol cotton blue).
    d. Spore staining.
    e. Capsule staining.
5. To learn culture preservation techniques (Agar slants, stabs and glycerol stocks).
6. Determination of bacterial growth by turbidity measurements and to plot bacterial growth curve.
7. To check motility of bacteria by hanging drop and semi-solid agar methods.
8. Antimicrobial activity of Antibiotics by disk diffusion method.
9. Determination of MIC of Antibiotics/detergents.
10. Isolation of plasmid DNA from bacteria.

Course Outcome

1. Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria
2. Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively.
3. Comprehend the various practical skills in microscopy, their handling techniques and staining.
4. This course is intended to provide practical knowledge about the measurement of bacterial growth, and inhibitory effects of antibiotics and detergents on bacteria.
5. Students will be made familiar to DNA extraction technique.

SEMESTER II

Course Code: Mib-2041
Course Title: Molecular Biology and Microbial Genetics
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

Course Objectives: *The objective of this course is to provide the students with the in-depth knowledge of molecular aspects of genetic material: organisation and expression. Moreover, this course will familiarize students with the requisite knowledge of microbial genetics.*

Unit – 1 Gene Structure, Replication and Repair

1.1 Nucleic acid as genetic information carriers: experimental evidence; Concept of gene and genome; Organization of genetic material in prokaryotes and eukaryotes.

1.2 Structure of DNA, super helicity of DNA, linking number, topological properties and role of topoisomerase. DNA denaturation and renaturation.

1.3 DNA replication: general principle, various mode of replication, unwinding of DNA helix, continuous and discontinuous synthesis of leading and lagging strands; Enzymes of DNA replication in prokaryotes and eukaryotes; DNA polymerases, DNA ligase, primase.

1.4 DNA damage and repair: types of DNA damage (deamination, oxidative damage, alkylation and pyrimidine dimers), repair mechanism; mismatch repair, nucleotide excision repair, recombination repair, SOS repair.

Unit – 2 Transcription and its Regulation

2.1 Structural features of RNA (rRNA, tRNA, and mRNA) and polycistronic and monocistronic RNA.

2.2 Transcription: general principle and processes of transcription; initiation, elongation and termination, types of RNA polymerases, inhibitors of RNA synthesis.

2.3 Control of Transcription by interaction between RNA polymerases and promoter region, use of alternate sigma factors, controlled termination: Rho dependent and Rho independent.

2.4 Posttranscriptional modification, maturation and splicing of RNA transcripts, catalytic RNA.

Unit – 3 Translation

3.1 Genetic code: nature of genetic code, codon, anticodon, wobble hypothesis.

3.2 Protein synthesis: steps, details of initiation, elongation and termination.

3.3 Inhibitors of protein synthesis: signal hypothesis.

3.4 Post translational modification: covalent modification, phosphorylation, glycosylation, methylation; Protein targeting.

Unit – 4 Regulation of Gene Expression

4.1 Regulation of gene expression: operon concept; regulatory and structural gene, operator, promoter, repressor, induction and repression, positive and negative control.

4.2 *Lac*-operon, *ara*-BAD operon, *trp* operon, attenuation, mechanism of regulation of transcription.

4.3 Regulation at the level of translation.

4.4 Global regulatory systems; Catabolite Repression and Quorum Sensing.

Unit – 5 Microbial Genetics: Mechanisms of Genetic Variation

5.1 Mutations and their chemical basis: Spontaneous mutations, Induced mutations, Effects of mutations (Silent, Missense, Nonsense and Frame shift mutations); Detection and Isolation of Mutants, Carcinogenicity testing.

5.2 Creating genetic variability: Recombination in eukaryotes, Horizontal gene transfer in prokaryotes, recombination at molecular level; Transposable genetic elements and bacterial plasmids.

5.3 Bacterial Conjugation: F^+xF^- Mating; Hfr Conjugation; F' Conjugation; DNA Transformation; Transduction: Generalized Transduction, Specialized Transduction.

5.4 Genome mapping; Recombination and genome mapping in viruses.

Course Outcome

1. To develop a thorough understanding about the genetic information carriers molecules.
2. To familiarize students with the concepts of Gene and Genome, organisation of genetic material, genome mapping and nucleic acid repair systems.
3. To acquaint students with the concepts of nucleic acid metabolism, protein synthesis and regulation of gene expression with special reference to Operon system.
4. Development of understanding about genetic variation in microbial systems and gene transfer mechanisms.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, Mc Graw HillHigher education.

2. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.

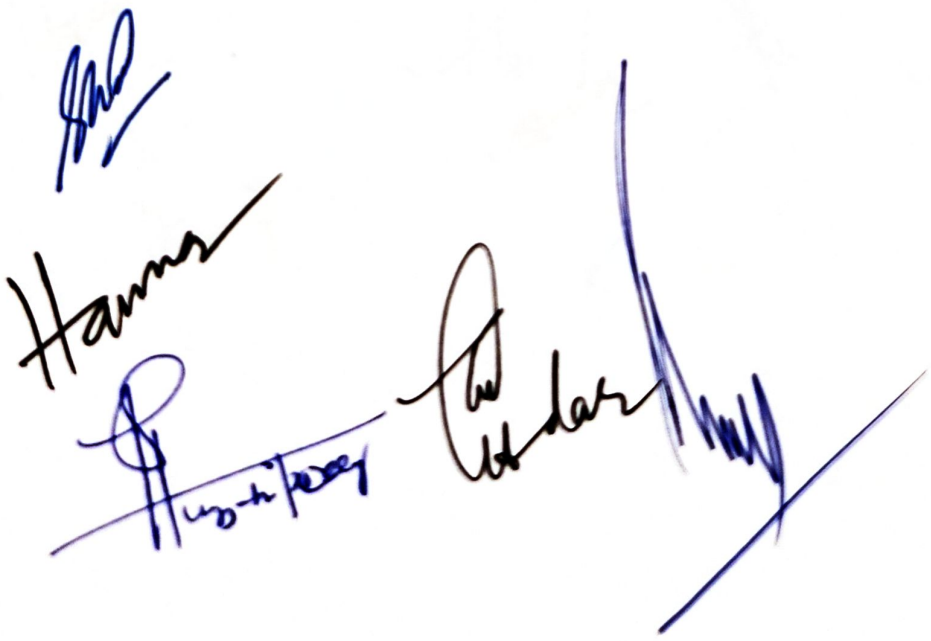
3. Stryer, L. (2015). *Biochemistry* (8th Ed.). New York: Freeman.

4. Lehninger, A. L. (2012). *Principles of Biochemistry* (6th Ed.). New York, NY: Worth.

5. Voet, D., & Voet, J. G. (2016). *Biochemistry* (5th Ed.). Hoboken, NJ: J. Wiley & Sons.

6. Brown, T.A (Ed.) (1991). *Molecular Biology*. Bios Scientific Publishers Ltd, Oxford.

7. Clark, D. P. (2005). *Molecular Biology: Understanding the Genetic Revolution*. Elsevier Academic Press, UK.



2. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.

3. Stryer, L. (2015). *Biochemistry* (8th Ed.). New York: Freeman.

4. Lehninger, A. L. (2012). *Principles of Biochemistry* (6th Ed.). New York, NY: Worth.

5. Voet, D., & Voet, J. G. (2016). *Biochemistry* (5th Ed.). Hoboken, NJ: J. Wiley & Sons.

6. Brown, T.A (Ed.) (1991). *Molecular Biology*. Bios Scientific Publishers Ltd, Oxford.

7. Clark, D. P. (2005). *Molecular Biology: Understanding the Genetic Revolution*. Elsevier Academic Press, UK.

SEMESTER II

Course Code: Mib-2042
Course Title: Microbial Diversity
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

Course Objectives: *The objective of this course is to familiarize students with the diverse domains of microbial world and impart necessary knowledge about conservation of microbes and Host-pathogen interactions.*

Unit – 1 Classification of Microbes

1.1 Microbial World: Concepts and Scope. Types of diversity: Morphological, Structural, Metabolic, Biological, Ecological and Evolutionary diversity (Genetic diversity) of microbial world.

1.2 Classifying and Naming Microorganisms: Classification systems, ICBN Rules, Major Characteristics used to Classify Microorganisms.

1.3 Bacterial Diversity: Archeabacteria, Photosynthetic Eubacteria, Chemoautotrophic and Methophilic Eubacteria, Gliding Eubacteria, Spirochetes, Rickettsiae and Chlamydiae, Actinomycetes, Mollicutes, Protists.

1.4 Classification based on Bergey's manual (Determinative & Systematic).

Unit – 2 Viruses and Sub-Viral Particles

2.1 Viral Diversity: Classification of viruses, Group I – T2 Bacteriophage, Group II – Banana bunchy top virus.

2.2 Group III – Reovirus, Group IV- TMV, Group V – Rhabdovirus, Group VI – HIV, Group VII – Hepatitis virus.

2.3 Sub-viral particles: Discovery, Structure, Classification, replication and diseases caused by Satellite, Satellites virus

2.4 Virusoids, Viroids and Prions.

Unit – 3 Fungal Diversity

3.1 Eukaryotic microbes: algae, fungi, slime molds and protozoa; extremophiles and unculturable microbes.

3.2 Fungal Diversity: Classification, Distribution and Importance.

3.3 Structure, reproduction and general characteristics of the fungal divisions: Zygomycota (*Rhizopus*), Ascomycota (*Neurospora*), Basidiomycota (*Agaricus*).

3.4 Structure, reproduction and general characteristics of the fungal divisions: Deuteromycota (*Penicillium*), Chytridiomycota (*Allomyces*), Myxomycota and Yeast.

Unit – 4 Importance of Microbial Diversity

4.1 Importance and Conservation of Microbial Diversity: Importance of microbial diversity in agriculture, forestry, environment, industrial & food biotechnology, animal & human health.

4.2 Metagenomics and its importance.

4.3 Importance of conservation. *In situ* conservation and *ex situ* conservation.

4.4 Role of culture collection centers in conservation.

Unit-5 Host-Microbe Interaction and Microbial Control

5.1 Host-pathogen interaction, ecological impacts of microbes; symbiosis (Nitrogen fixation and ruminant symbiosis).

5.2 Microbes and nutrient cycles; microbial communication system; bacterial quorum sensing; microbial fuel cells; prebiotics and probiotics, Chemotaxis.

5.3 Sterilization, disinfection and antisepsis: physical and chemical methods for control of microorganisms.

5.4 Antibiotics, antiviral and antifungal drugs, biological control of microorganisms.

Course Outcome

1. To make students understand the ideas of microbial diversity, classification, importance of diversity and conservation thereafter.
2. Detailed understanding of Eukaryotic, extremophilic and unculturable microbes, diversity and characteristic features.
3. Introduction to viruses and subviral particles, their diversity, replication mechanism and the diseases associated.
4. Thorough understanding of host-pathogen relation and microbial control methods.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Pelczar, (Jr.) M. J., Chan, E. C. S. and Kreig, N. R.1993. *Microbiology*. McGraw Hill, New York

2. Presscott, L. M., Harley, J. P. and Klein, D. A. 1999. *Microbiology*. 4th edn. WCB Mc Graw- Hill, New Delhi.

3. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts

4. Alexopoulos, C. J. and Mims, C. W. 1979. *Introductory Mycology*. III edition, Wiley Eastern, New Delhi.

5. Dimmock, N. J., Easton, A. J. and Leppard, K. N. 2001. *Introduction to Modern Virology*. 5th edn. Blackwell publishing, USA.

6. Perry, J.J. and Staley, J.T. 1997. *Microbiology. Dynamics and Diversity.* 4th edn. Wesley Longman pub. New York.

7. Satyanarayana, T. and Johri, B. N. 2005. *Microbial Diversity – Current Perspectives and Potential Applications.* I K Int. Pvt. Ltd. New Delhi.

8. Stanley J. T. and Reysenbach A. L.1977. *Biodiversity of microbial life.* John Wiley & Sons Inc. Publication. New York.

SEMESTER II

Course Code: Mib-2043 | **Total Marks: 100**

Course Title: Enzymology and Metabolism | **Internal Assessment: 40**

Credits: 04 | **External Examination: 60**

Duration of Course: 72 Hours | **Duration of Exam: 03 Hours**

Course Objectives: *The objective of this course is to impart requisite knowledge about enzymes & Enzyme catalysis. This course will introduce to students an understanding of bioenergetics and metabolism.*

Unit 1--Enzyme Kinetics

1.1 Nomenclature and classification of enzymes: Enzyme Commission's system of classification, six main classes of enzymes; co-factors and coenzyme.

1.2 Factors affecting enzyme activity: pH, temperature, substrate and enzyme concentration; ribozymes and abzymes.

1.3 Reaction kinetics: chemical kinetics- Michaelis-Menten equation using steady state kinetics, significance of- Kcat, Km and Kcat/Km.

1.4 Enzyme inhibition: competitive, non-competitive, uncompetitive and mixed inhibitions; allostery of enzyme action: MWC model, KNF model.

Unit 2--Enzyme Catalysis

2.1 Mechanism of catalysis: acid-base catalysis and covalent catalysis (examples of enzyme catalysis using chymotrypsin and ribonuclease).

2.2 Multi-enzyme complex: fatty acid synthase, allosteric regulation of aspartate transcarbamylase

2.3 Mapping of active site: Affinity labelling and chemical modification methods of active site determination.

2.4 Immobilization of enzymes, properties and application of immobilized enzymes. Isoenzymes- application and significance

Unit 3-- Bioenergetics and Carbohydrate metabolism

3.1 Principles of bioenergetics: Energy transformation, laws of thermodynamics, spontaneity of a process, life and thermodynamics.

3.2 Carbohydrate metabolism: aerobic and anaerobic pathways, glycolysis, citric acid cycle, oxidative phosphorylation and electron transport chain.

3.3 Alternate pathways of glucose metabolism-pentose phosphate pathway, glyoxalate cycle, and glucuronic acid cycle.

3.4 Gluconeogenesis, glycogen synthesis and breakdown.

Unit –4 Lipid metabolism

4.1 Oxidation of lipids: beta oxidation, oxidation of unsaturated and odd chain fatty acids and formation of ketone bodies.

4.2 Biosynthesis of fatty acids: carbon sources, acetyl CoA carboxylase and reactions of fatty acid synthase complex, synthesis of odd chain and unsaturated fatty acids.

4.3 Lipoproteins: Low density lipoproteins (LDL), Very low density lipoproteins (VLDL), High density lipoproteins (HDL) and Chylomicrons.

4.4 Biosynthetic pathway of cholesterol.

Unit 5--Nitrogen metabolism

5.1 Oxidative degradation of amino acids: transamination, oxidative deamination, urea cycle and ammonia excretion.

5.2 Biosynthesis of essential (leucine, isoleucine and valine) and non-essential (alanine, asparagine and glutamine) amino acids.

5.3 Regulation of amino acid biosynthesis, genetic defects in amino acid metabolism.

5.4 Biosynthesis of purine and pyrimidine nucleotides, regulation of nucleotide synthesis, Nitrogen fixation: nitrogenase system and nitrate reductase.

Course Outcome

1. Development of understanding about Enzymes their activity, kinetics and factors affecting enzyme activity.
2. Acquainting students with the concepts of enzyme catalysis, multienzyme complexes and immobilization of enzymes.
3. Detailed understanding of metabolic concepts: carbohydrate, Lipid and nitrogen metabolism.
4. Thorough understanding about biosynthetic pathways of fatty acids and amino acids.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, McGraw Hill Higher education.
2. Price & Stevens. (1999). *Fundamentals of Enzymology*
3. Palmer, T. (2001). *Enzyme; Biochemistry, Biotechnology*, Clinical Chemistry. Horwood Ltd.
4. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.
5. Stryer, L. (2015). *Biochemistry* (8^{th}ed.). New York: Freeman.
6. Lehninger, A. L. (2012). *Principles of Biochemistry* (6^{th}ed.). New York, NY: Worth.
7. Voet, D., &Voet, J. G. (2016). *Biochemistry* (5^{th}ed.). Hoboken, NJ: J. Wiley & Sons.

SEMESTER II

Course Code:
Course Title: Open Elective*
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

List of Open Electives

SECOND SEMESTER				
S. No.	**Paper Code**	**Paper Title**	**Course Type**	**Credits**
1	Math-201	Mathematical Tools for Real World Problems	OE	04
2	IT-202	Soft Skills in Information Technology	OE	04
3	Comp-203	Computer Applications and Operations	OE	04
4	Bio-2541	Fundamentals of Biotechnology	OE	04
5	Bot-205	Mysteries of Green Plants	OE	04
6	Bot-206	Botany in Rural Development	OE	04
7	Zol-207	Nutrition, Health and Hygiene	OE	04
8	Arab-208	Fundamentals of Arabic Language	OE	04
9	Eng-209	Applied English	OE	04
10	Edu-210	Higher Education	OE	04
11	Eco-211	Principles of Banking	OE	04
12	HT-212	Basics of Tourism and Travel Agencies	OE	04
13	HT-213	Tourism Resources of J&K	OE	04
14	Mgt-214	Business Communication and Soft Skills	OE	04
15	Edu-215	Instructional Technology	OE	04
16	EVS-240	Environment and Social Issues	OE	04

Open Elective (OE) course to be opted by Microbiology students*

Note: Candidate has to opt only one course out of 16 courses offered

SEMESTER II

Course Code: Mib-2541 **Total Marks: 100**

Course Title: The Microbial World" (Open Elective Course) **Internal Assessment: 40**

Credits: 04 **External Examination: 60**

Duration of Course: 72 Hours **Duration of Exam: 03 Hours**

Open Elective Course offered to PG students of discipline other than of Microbiology

Course Objectives: *The objective of this course is to introduce students to the diversity, importance & pathogenesis of microorganisms and familiarize them with the practical aspects of microbial cultures.*

Unit 1: Introduction to microbiology and microbial diversity

1.1 Brief history and development of microbiology as discipline.

1.2 Theory of spontaneous generation vs. biogenesis, Germ theory of diseases.

1.3 General characterization of viruses, bacteria, algae, fungi and protozoa.

1.4 Scope of microbiology.

Unit 2: Microbial techniques to understand microbial world

2.1 Microscopy: Simple, compound and Electron microscope.

2.2 Nutritional requirements in bacteria and nutritional categories.

2.3 Culture media: components of media, natural and synthetic media.

2.4 Microbial Control: heat (moist and dry), filtration and radiation; Halogens, phenol and other phenolic compounds, heavy metals, alcohols, ethylene oxide and aldehydes.

Unit 3: Importance of microbial world for humankind

3.1 Brief introduction to human gut microbial flora and their benefit.

3.2 Importance of nitrogen cycle and role of bacteria in nitrogen cycle.

3.3 Microbial significance in waste management. Microbial indicators of climate change

3.4 Antibiotics: classification, mode of action and development of antibiotic resistance in bacteria.

Unit 4: Microbiology and Food Industries.

4.1 Water portability: treatment and safety of drinking water, faecal coliforms.

4.2 Natural flora and source of contamination of food.

4.3 Physical and chemical methods of food preservation: Temperature (low, high and drying), salt, sugar and antibiotics.

4.4 Probiotics: health benefits, types of microorganism used, and probiotic food available in market.

Unit 5: Common communicable diseases caused by microbes and their prevention.

5.1 Flu, Hepatitis, Tuberculosis, measles and AIDS: cause and symptoms.

5.2 Types of transmission (Direct and Indirect) and control measures.

5.3 Personal hygiene and its significance

5.4 Social hygiene and control of communicable diseases.

Course outcome

1. To make students understand the ideas of microbial diversity, classification, importance of diversity.
2. Understanding importance of microbes in waste management and role in human health.
3. To develop an understanding among students about the importance of microbes in food industries and probiotics.
4. To acquaint students with the diseases caused by microbes and control methods.

Note for the paper setter:

This is an 'OPEN ELECTIVE' paper and is meant for students of other discipline than microbiology. The paper setter must keep this in view while selecting the 'level' of questions in the examination. The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, Mc Graw Hill Higher education.
2. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.
3. M.T, Martinko, J.M. Parker, *Brock Biology of Microorganism*; Prentice-Hall.
4. M.J. Pelczar, E.C.S Chan and N.R. Kreig, *Microbiology;* Tata MacGraw Hill.

SEMESTER II

Course Code: Mib-2621
Course Title: Seminar/Journal Club (JC)
Credits: 02

Total Marks: 50
Internal Assessment: 50
Duration of Course: 36 Hours

- Topics of Seminar/Research Article be allotted to every student along with a supervisor / mentor.
- Students should make a 30 min. PowerPoint presentation of the same, which all the faculty of the department and students should attend.
- The seminar should be followed by a brief quiz (5 questions; MCQ based), prepared by the concerned faculty on the topic, which all the students should attempt.
- Assessment of the students should be based on their seminar presentation [25%], as assessed individually by all faculty members, as well as their accumulated averaged performance in the quiz [75 %].

SEMESTER II

Course Code: Mib-2721 **Total Marks: 50**

Course Title: Laboratory IV: Microbial Genetics and Molecular Biology

Internal Assessment: 25

Credits: 02 **External Examination: 25**

Duration of Course: 72 Hours

Course objectives: *The objective of this laboratory course is to impart practical skills in molecular aspects of microbial genetics.*

Microbial Genetics and Molecular Biology

1. To induce mutation by UV radiations and to exhibit DNA repair by photo reactivation.
2. To isolate and produce UV induced auxotrophic mutants by replica plating method.
3. To perform Ames test for detecting carcinogen or mutagen.
4. Isolation of Plasmid DNA from bacteria.
5. To isolate genomic DNA from Gram positive and Gram-negative bacteria.
6. To check purity and quantity of DNA by Spectrophometeric method.
7. To isolate total RNA and mRNA from bacteria
8. Quantification of DNA by DPA method.
9. Quantification of RNA by Orsinol method
10. Transformation of chemically competent *E. coli.*
11. Demonstration of genetic recombination in bacteria by conjugation.
12. Demonstration of transduction and production of bacteriophages
13. To perform SDS-PAGE for separation of proteins in given sample.

Course Outcome

1. This course is intended to train students with DNA and RNA extraction from bacteria and its quantitative and qualitative measurements by different methods.
2. To demonstrate UV induced mutations to produce mutants and their detection.
3. To demonstrate genetic recombination in bacteria by conjugation, transduction and transformation.
4. To perform protein separation by SDS-PAG

SEMESTER II

Course Code: Mib-2722
Course Title: Laboratory V: Microbial Diversity
Credits: 02
Duration of Course: 72 Hours

Total Marks: 50
Internal Assessment: 25
External Examination: 25

Course Outcome: *The objective of this laboratory course is to provide practical skills on isolation of pure culture techniques from various sources, followed by Identification and characterization.*

Microbial Diversity

1. Isolation and identification of Bacteria from food and water.
2. Isolation and identification of Bacteria various soil samples
3. Isolation and identification of air microflora.
4. Isolation of microbes from external human normal microflora.
5. Isolation and identification and study of *Actinomycetes* from soil.
6. Isolation and identification and study of Cyanobacteria from soil / paddy field.
7. Isolation and study of Bacteriophages from sewage.
8. Preparation of basic solid media agar slants and agar deep tubes for cultivation of fungi.
9. Isolation and identification of fungi from soil/cereals/water by serial dilution technique.

Course Outcome

1. To train students with the techniques to Isolate and identify bacteria from different sources especially Actinomycetes and Cyanobacteria from soil.
2. To provide practical knowledge regarding isolation and identification of Fungi and its cultivation on agar media.
3. To isolate and study bacteriophage from sewage.
4. To prepare media for the cultivation of bacteria and fungi and their identification.

SEMESTER II

Course Code: Mib-2723 **Total Marks: 50**

Course Title: Laboratory VI: Enzymology and Metabolism **Internal Assessment: 25**

Credits: 02 **External Examination: 25**

Duration of Course: 72 Hours

Course Objectives: *The course aims to develop skills of performing basic biochemical tests important in clinical investigations, to develop familiarity with biochemical laboratory techniques, and to introduce students to various practical aspects of enzymology and metabolism*

Enzymology and Metabolism

1. Biochemical calculations and reagent preparation
2. Estimation of proteins by Lowery's method.
3. Estimation of proteins by Biuretic method.
4. Effect of pH and temperature on enzyme activity.
5. Biochemical Tests for sugars (any one):
   a. Molish's test
   b. Fehling's test
6. Biochemical Tests for amino acids (any one):
   a. Ninhydrin test
   b. Xanthoproteic test
7. Biochemical Tests for lipids (any one):
   a. Solubility test
   b. Saponification test
8. To study catalase activity of given microbial culture.
9. To study oxidase activity of given microbial culture.
10. To study ability of microorganisms to hydrolyse casein.
11. To demonstrate phenylalanine deaminase activity of given bacterial culture.

12. To demonstrate L-lysine decarboxylase activity of bacterial culture.
13. To demonstrate carbohydrate metabolism (oxidation and fermentation of Glucose) in microorganisms.
14. To demonstrate Fat hydrolysis (lipase activity) by bacteria.
15. To study ability of microorganisms to hydrolyse gelatin.
16. To demonstrate degradation of sulphur containing amino acids by bacteria.

Course Outcome

1. To acquaint students with the calculations and reagent preparation.
2. To make students perform estimation of proteins and biochemical testing for sugars, lipids and amino acids by different methods.
3. To provide practical knowledge of different enzyme activities of bacteria.
4. To provide practical insight into carbohydrate and fat hydrolysis and amino acid degradation by bacteria.

SEMESTER III

Course Code: Mib-3041 | **Total Marks: 100**

Course Title: Immunology | **Internal Assessment: 40**

Credits: 04 | **External Examination: 60**

Duration of Course: 72 Hours | **Duration of Exam: 03 Hours**

Course Objectives: *The objective of this course is to learn about the structural features of the components of the immune system as well as their functions and responsiveness*

Unit 1- Immunology

1.1 Types of immunity, innate and adaptive, hematopoiesis. The host-microbe relationship: Normal body flora; Pathogen and their abilities to cause disease. Host defense barriers and its breach for the establishment of infection and disease; Virulence factors and ability of pathogen to escape host to spread disease.

1.2 Cells and organs of immune system: B and T cells, macrophages, dendritic cells, NK cells, eosinophills, neutrophils and mast cells, organs; thymus, bursa of fabricus, spleen, lymph nodes and lymphatic system.

1.3 Immunoglobulin: structure, classes and subclasses; Nature and biology of antigens, immunogenicity versus antigenicity, epitopes, antigen- antibody interactions and heptans.

1.4 Generation of antibody diversity; Basis of self and non-self-discrimination.

Unit 2-- Humoral and cell mediated immunity

2.1 Major histocompatibility complex and HLA system, recognition of antigens by T-cells and role of MHC; implication of linkage disequilibrium and disease association.

2.2 Antigen processing and presentation: endogenous and exogenous antigens; super antigens.

2.3 Complement fixing antibodies and complement pathways; ADCC.

2.4 Cytokines, types and functions, cell adhesion molecules, cytokine related diseases; therapeutic uses of cytokines.

Unit 3-- Clinical Immunology

3.1 Type I, type II, type III and type IV hypersensitivity reactions.

3.2 Autoimmune disorders: Systemic lupus erythematosus (SLE), Multiple sclerosis (MS) and Arithritis.

3.3 Cancer: oncogenes and proto-oncogenes, tumor antigens, tumor evasion of immune system. Organ transplantation: Role of CD4+ T cells; immunological basis of graft rejection and immunosuppressive therapy.

3.4 AIDS, HIV infection of Target Cells and Activation of Provirus. Infectious disease epidemiology: Reservoirs of infectious diseases; Modes of transmittance of infectious diseases; Mode of occurrence of disease in the population; Nosocomial Infections; Infectious diseases and Public Health Organizations.

Unit 4-- Immunodiagnostic Procedures

4.1 Techniques: flow cytometry, ELISA, RIA (principles, properties and applications).Serological reactions and techniques: Neutralization; Precipitation; Agglutination; Complement fixation test.

4.2 Immunofluorescence and Fluorescence microscope; Western Blotting.

4.3 Immunodiffusion: Mancini and Ouchterlony methods; immunoelectrophoresis.

4.4 Separation of immunoglobulin from serum.

Unit 5—Immunobiotechnology and Transplantation

5.1 Monoclonal antibodies: production, detection and applications; chimeric and hybrid monoclonal antibodies.

5.2 Active and passive immunization: live, killed, attenuated; conventional vaccines. Vaccine technology: recombinant DNA and peptide vaccines.

5.3 Stem cells: overview of stem cells, functions and medical applications.

5.4 Transplantation of tissues and organs; Allograft Rejection and role of Immunosuppressive Agents; HLA-matching; Transplant survival and immunotherapy; Xenotransplantation; Role of transgenic animals as organ donors.

Course outcome

1. Development of understanding about Immunity. Cells and organs of immune system and their modes of action.
2. Major understanding of types of immune system, and MHCs and HLA system.
3. Development of understanding about Autoimmune Disorders and immunological techniques with special reference to ELISA and RIA.
4. Acquainting students with the concepts of Immunization, monoclonal antibodies, Stem cells and transplantation.

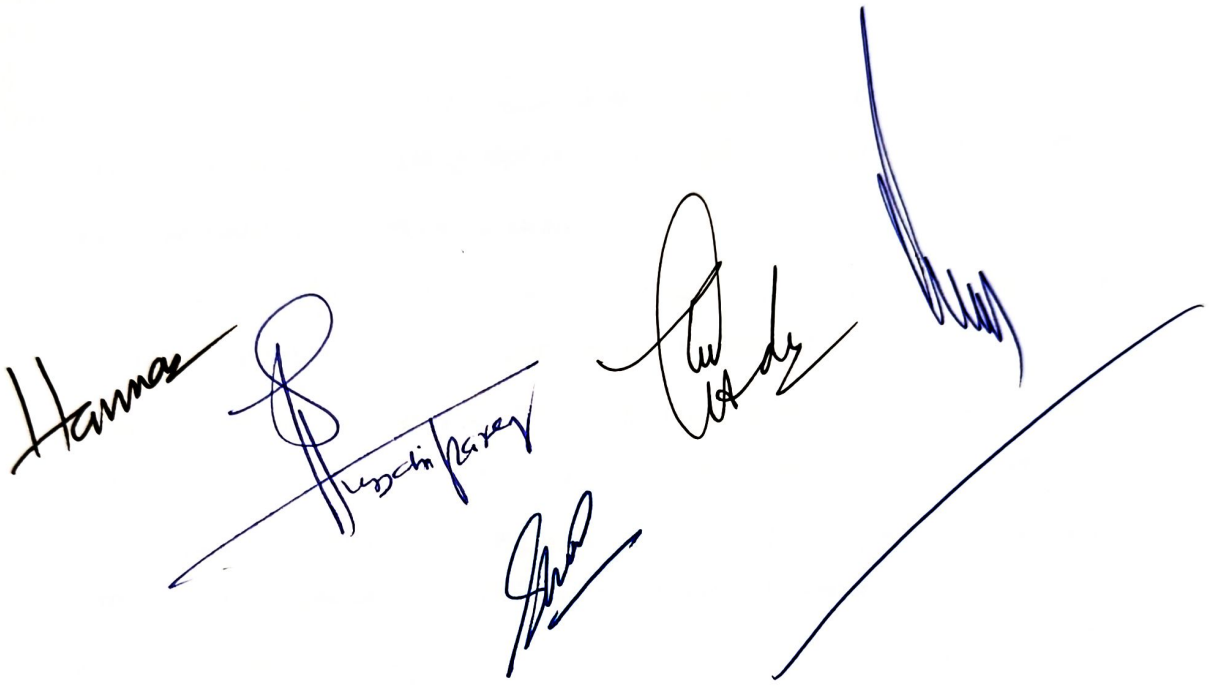
Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum- short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, McGraw Hill Higher education.
2. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.
3. Coleman, R.M., Lombard, M.F. and Sicard, R.E. 1992. *Fundamental Immunology*, 2nd ed, Dubuque, Iowa: Wm. C. Brown.
4. Janeway, C.A., and Travers, P. 1997, *Immunobiology: The immune system in health and disease*, 3rd ed. New York, Garland Publishing.
5. Kuby, J. 1997, *Immunology*, 3rded. New York, W.H. Freeman.

6. Male, D., Champion, B., Cooke, A. and Owen, M. 1991. *Advanced Immunology*. Mosby Publication, Baltimore.



SEMESTER III

Course Code: Mib-3042 **Total Marks: 100**

Course Title: Industrial Microbiology and Fermentation Technology **Internal Assessment: 40**

Credits: 04 **External Examination: 60**

Duration of Course: 72 Hours **Duration of Exam: 03 Hours**

Course Objectives: *The objective of this course is to familiarize the students with microbial fermentation, Fermentation technology and industrial production of microbial products.*

Unit – 1 Introduction to Fermentation

1.1 General concept of microbial fermentation; Definition of primary and secondary metabolites, and screening of new metabolites.

1.2 Industrially important strains of bacteria, fungi, and *Actinomycetes.* Isolation and screening of the industrially important strain from diverse ecosystem.

1.3 Methods of Strain development for industrial purposes: mutation, recombination, protoplast fusion, regulation and gene technology.

1.4 Substrates used as carbon and nitrogen source for industrial fermentation.

Unit – 2 Fermentation Technology

2.1 Fermentation technology: Types of fermentation, Batch, fed batch and continuous fermentations.

2.2 Growth Kinetics of microorganism during fermentation. Introduction to Fermenters and Bioreactors

2.3 Downstream processing: introduction, removal of microbial cells and solid matter, foam separation, precipitation, filtration, centrifugation, cell disruption and liquid-liquid extraction, Chromatography, membrane filtration, drying and crystallization.

2.4 Effluent treatment: B.O.D and C.O.D treatment and disposal of effluents; Sterilization and pasteurization of products, canning, packing, preservation and hygiene.

Unit – 3 Microbial products-1

3.1 Microbial production of alcohols: vinegar, wine and alcohol.

3.2 Microbial production of solvents-glycerol, acetone, and butanol.

3.3 Microbial production of citric acid and glutamic acid.

3.4 Fermentation of antibiotics (Penicillin and Streptomycin).

Unit – 4 Microbial products-2

4.1 Microbial production of enzymes and proteins of industrial importance: Amylase, Protease, Glucose Isomerase; Interfron and Insulin

4.2 Microbial production of Vitamin B2 and B12; Flavors and fragrances.

4.3 Production of Yeast and Yeast derived Products, Role of microbes and microbial enzymes in the fermentation of tea, coffee and cocoa.

4.4 Production and characteristics of microbial plastics (bioplastics) and biopolymers. Production of Vaccines.

Unit-5 Microbial products-3

5.1 Biofuels: Microbial production of ethanol, biogas and hydrogen

5.2 Role of microbes in composting, Agricultural utilization of biogas sludge.

5.3 Biomining: coal, mineral and gas formation, prospecting for deposits of crude, oil and gas

5.4 Role of microbes in the recovery of minerals from low-grade ores.

Course outcome

1. Development of Understanding about Fermentation technology, types of fermentation and their uses in industries.
2. Acquainting students with the concepts of scale up, bioreactors, bacterial strains used in fermentation and substrates thus used.

3. Familiarizing students with the concepts of microbial production of alcohols, solvents, antibiotics and other microbial derived products.
4. Development of understanding about different processes involved in product recovery and treatment of effluent hence formed.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Crueger, W. and Crueger, A. (2002) Biotechnology: *A Textbook of Industrial Microbiology*. Science Tech Inc. Publishers.
2. Stanbury, P. F., & Whitaker, A. (1984). *Principles of Fermentation Technology*. Oxford: Pergamon Press.
3. Casida, L.E. 1997. *Industrial Microbiology*. New Age International Publishers.
4. Demain, A. L. 2001. *Industrial Microbiology and Biotechnology* 2nd Edition. ASM Press, Washington.
5. El-Mansi, E.M.T. and Bryce, C.F.A. 2004. *Fermentation Microbiology and Biotechnology*. Taylor and Francis Group.
6. Julian E Davies and Arnold L Demain 2009 *Manual of Industrial Microbiology and Biotechnology* ASM Publisher
7. Maheshwari, D.K., Dubey, R.C. and Saravanamtu, R. 2010. *Industrial Exploitation of Microorganisms*. I.K. International Publishing House. New Delhi.

SEMESTER III

Course Code: Mib-3021
Course Title: Microbial Ecology
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to familiarize the students with an in-depth study on microbial ecology, microbial habitats and the interactions of microbes with surroundings*

Unit – 1 Introduction to Microbial Ecology

1.1 Biogeochemical Cycles: Carbon cycle and Nitrogen cycle.

1.2 Biogeochemical Cycles: Phosphorus cycle and Sulfur cycle.

1.3 Physical Environment: Microbial habitat and Niche; Biofilms; Microorganisms and Ecosystem and their movement between ecosystems; Extreme Environment.

1.4 Microbial Ecology and its Methods: Examination of microbial population; Examination of microbial community structure; Metagenomics; Microbial activity and turnover.

Unit – 2 Microorganisms in Marine, Freshwater and Terrestrial Environment

2.1 Marine and Freshwater Environments: Microbial habitat and nutrient cycling in marine and freshwater; Microbial adaptations to aquatic environment.

2.2 Microorganisms in marine environment: Costal Marine System (Estuaries and Salt Marshes); Open oceans and benthic marine environments. Microorganisms in Freshwater: Glaciers and permanently frozen lakes; Streams, rivers and lakes.

2.3 Microorganisms of soil; Microbial association with vascular plants: Phyllosphere and Rhizosphere Microbes; *Mycorrhizae*; Nitrogen Fixation; Fungal and bacterial endophytes and *Agrobacterium*.

2.4 Soil Microbes and Atmosphere: Microbial production of greenhouse gasses (CO_2 and Methane); Microorganisms of subsurface.

Unit – 3 Microbial Interactions

3.1 Microbial Interactions: Mutualism, Cooperation, Commensalism and Predation.

3.2 Microbial Interactions: Parasitism, Amensalism and Competition. Internal-

3.3 Normal microbiota of human body: External-Skin, Nose and Nasopharynx, Respiratory tract, eye, ear and mouth.

3.4 Normal microbiota of human body: Stomach, small and large intestine and genitourinary tract; Relationship between normal microbiota and host.

Course Outcome

1. Introduction to Microbial ecology, biochemical and biogeochemical cycles and methods used to determine microbial ecology.
2. Development of understanding about microbial habitats/environments.
3. To acquaint students to the ideas of microbial interaction and its various types.
4. To develop an understanding of normal Microbiota of human body and the relationship between microbiota and host.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

2.4 Soil Microbes and Atmosphere: Microbial production of greenhouse gasses (CO_2 and Methane); Microorganisms of subsurface.

Unit – 3 Microbial Interactions

3.1 Microbial Interactions: Mutualism, Cooperation, Commensalism and Predation,

3.2 Microbial Interactions: Parasitism, Amensalism and Competition. Internal-

3.3 Normal microbiota of human body: External-Skin, Nose and Nasopharynx, Respiratory tract, eye, ear and mouth.

3.4 Normal microbiota of human body: Stomach, small and large intestine and genitourinary tract; Relationship between normal microbiota and host.

Course Outcome

1. Introduction to Microbial ecology, biochemical and biogeochemical cycles and methods used to determine microbial ecology.
2. Development of understanding about microbial habitats/environments.
3. To acquaint students to the ideas of microbial interaction and its various types.
4. To develop an understanding of normal Microbiota of human body and the relationship between microbiota and host.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Presscott, L. M., Harley, J. P. and Klein, D. A. 1999. *Microbiology.* 4th edn. WCB Mc Graw- Hill, New Delhi.
2. Pelczar, (Jr.) M. J., Chan, E. C. S. and Kreig, N. R.1993. *Microbiology.* McGraw Hill, New York
3. *Microbial Ecology: Fundamentals and Application* (4th edition) Ronald M. Atlas and Richard Bartha, Pearson Education International (1998)
4. *Microbiolgy Ecology: Fundamental & Applications* by Atlas & Bartha (2005)
5. *Soil microbiology Ecology* and Biochemistry by EA Paul Academic press, IIIrd Edition (2007)
6. *General Microbiology* by Stainier *et. al.* MacMillan Press Ltd.(2005)
7. *Microbiology* by Davis *et. al.* Harper & Row Publishers (1980)
8. *Plant-microbe interactions,* Volume 1 by Gary Stacey and Noel T. Keen
9. *Plant-microbe interactions and biological control* Volume 63 of Books in soils, plants, and the environment by Greg J. Boland, L. David Kuykendall

SEMESTER III

Course Code: Mib-3022 | **Total Marks: 50**

Course Title: Environmental Microbiology and Toxicology | **Internal Assessment: 20**

Credits: 02 | **External Examination: 30**

Duration of Course: 36 Hours | **Duration of Exam: 02 Hours**

Course Objectives: *The objective of this course is to provide the students with an understanding of microbial association in various environments and the role of microbes in bioremediation and nutrient cycling.*

Unit – 1 Microbiology of Air and Water

1.1 Microbiology of air and aquatic environments, including sea water- Bacteriological indicators of pollution.

1.2 Bacteriological examination of water, nuisance bacteria in water systems. Chemical and microbiological characteristics

1.3 Biological Oxygen Demand (BOD), Microorganisms and pollution problems and interaction with human bodies.

1.4 Methods of detection of water borne pathogens.

Unit – 2 Environmental Pollution; Toxicity and Effect on Microbes

2.1 Environmental pollution: Definition, source and types of pollution (air, water and soil).

2.2 Xenobiotic toxicity/genotoxicity, Mutation detection by Ames, microsomal assay.

2.3 Microbial biotransformation/degradation of organic pollutants in soil.

2.4 Bioaccumulation and bioremediation, Biosensors; DNA probes and their environmental applications, Toxic genomics.

Unit – 3 Microbes in Recycling Of Nutrients

3.1 Recycling of organic waste: Major sources of recyclable material including agricultural waste.

3.2 Key technology in recycling of crop residues, human and animal wastes.

3.3 Role of microbes in composting and biogas production.

3.4 Municipal solid waste treatment and management.

Course Outcome

1. To acquaint students with the Microbiology of Air and water systems, pollution indicators and their chemical and microbiological characteristics.
2. To get students in touch with idea of biological oxygen demand (BOD), water borne diseases and their detection.
3. To let students understand the concept of Microbes as a means of recycling agricultural, animal and human wastes.
4. Microbial role in composting, biogas production and solid waste management.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Bhatia, A.L. 2010. *Textbook of Environmental Biology*. . I.K. International Publishing House. New Delhi.
2. Gregory, P.H. 1973. *The Microbiology of the Atmosphere*. Cambridge Univ. Press. London.

3. Lesinger, T. *et al.*, 1985. *Microbial Degradation of Xenobiotic and Recalcitrant compounds*. Academic Press. New York.

4. Mohapathra, P.K. 2008. *Textbook of Environmental Microbiology*. 2008. I.K. International Publishing House. New Delhi.

5. Suresh, G. 2007. *Environmental Studies and Ethics*. I.K. International Publishing House. New Delhi.

6. Tiwari, M., Khulbe, K. and Tiwari, A. 2007. *Environmental Studies*. I.K. International Publishing House. New Delhi.

7. Abbasi, S.A. 1998. *Environmental pollutionnd its control*. Cogent International publishers, Pondicherry.

SEMESTER III

Course Code: Mib-3023
Course Title: Food Microbiology
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of the course is to familiarize the students with the scope of food microbiology, food quality analysis and to understand fermentation technologies in the food processing industry.*

Unit – 1 Food Spoilage and Its Preservation

1.1 Foods and its composition; Food spoilage - Causes of spoilage, classification of foods by ease of spoilage.

1.2 Factors affecting the growth of microorganisms in foods; Types of microbes, which grow on food; Chemical changes caused by microorganisms.

1.3 Microbial flora and spoilage of meat, fish, fish products, eggs, milk and milk products, fruits, vegetables, juices and bakery products.

1.4 Methods of food preservation - General principles, preservation by use of chemicals, high temperature, low temperature and irradiation; Drying processes and aseptic poeolcoging materials.

Unit – 2 Food Quality And Its Control

2.1 Detection of microorganisms in foods. Food sanitation, Indicator organism; Food quality and assurance: Quality control parameters of various foods with special reference to microbiological quality.

2.2 Importance of microbiological quality during food processing and packaging; Food borne diseases, their causative agents and control measures.

2.3 Methods of quality assessment of foods: Sampling, qualitative and quantitative microbiological analysis.

2.4 Bacteriological examination of fresh and canned foods; Screening and enumeration of spoilage microorganisms; Food poisoning and food infections.

Unit – 3 Dairy Microbiology

3.1 Dairy Microbiology - Types of microorganisms in milk, significance of microorganisms in milk, microbiological examination of milk, control of microbial flora of milk.

3.2 Microbial products of milk- Acidophilus Milk, Bifidus Milk, Bulgarian milk, Kefir, Kumiss.

3.3 Microbiology of cheese, butter, yogurt.

3.4 Probiotics and Prebiotics: Properties and beneficial effects of probiotics and prebiotics; Screening methods of Probiotics; Genetically Modified Probiotics.

Course Outcome

1. To acquaint students with the idea of food spoilage and causes of spoilage. preservation of food and methods of preservation.
2. Development of understanding regarding detection of microorganisms in food items and quality control measures.
3. Introduction about types and significance of microbes in diary industry and microbial products of Milk.
4. Detailed understanding about Pro and Prebiotics, benefits, screening amd genetically modified probiotics.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Unit – 3 Dairy Microbiology

3.1 Dairy Microbiology - Types of microorganisms in milk, significance of microorganisms in milk, microbiological examination of milk, control of microbial flora of milk.

3.2 Microbial products of milk- Acidophilus Milk, Bifidus Milk, Bulgarian milk, Kefir, Kumiss.

3.3 Microbiology of cheese, butter, yogurt.

3.4 Probiotics and Prebiotics: Properties and beneficial effects of probiotics and prebiotics; Screening methods of Probiotics; Genetically Modified Probiotics.

Course Outcome

1. To acquaint students with the idea of food spoilage and causes of spoilage. preservation of food and methods of preservation.
2. Development of understanding regarding detection of microorganisms in food items and quality control measures.
3. Introduction about types and significance of microbes in diary industry and microbial products of Milk.
4. Detailed understanding about Pro and Prebiotics, benefits, screening amd genetically modified probiotics.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Adams M. R. and Moss M. O. 2000 *Food Microbiology*. Royal Society of Chemistry. Cambridge, U.K.
2. Thomas J. Montville, Karl R. Matthews 2008. *Food Microbiology: An Introduction*.ASM Press, U.S.A.
3. Barbara M. Lund, Baird-Parker, Gould G.W., 2000. *The Microbiological Safety and Quality of Food*. An Aspen publication, Maryland, U.S.A.
4. Bibek Ray 2004 *Fundamental Food Microbiology*. CRC Press, Florida.
5. Bohra and Parihar 2006 *Food Microbiology*. Agrobios, Jodhpur, India.
6. Doyle M.P. and Beuchat L.R. 2007 *Food Microbiology Fundamentals and Frontiers*. ASM Press, U.S.A.
7. Frazier W.C. and Westhoff C.D. 2008 *Food Microbiology*. Tata Mc Graw Hill Publishing Company Limited, New Delhi.
8. James M. Jay, Martin J. Loessner, David A. Golden 2005. *Modern Food Microbiology*. Springer Science, U.S.A.
9. Neelam Khetarpaul 2006. *Food Microbiology*. Daya Publishing House, Delhi.

SEMESTER III

Course Code:
Course Title: Discipline Centric Elective
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

LIST OF DISCIPLINE CENTRIC ELECTIVES (DCE)

S. No.	Paper Code	Paper Title	Course Type	Credits
1	Mib-3521	Biofertilizers and Biopesticides	DCE	2
2	Mib-3522	Analytical and Molecular Techniques	DCE	2

Note: Candidate has to opt only 1 course out of the 2 courses offered.

SEMESTER III

Course Code: Mib-3521
Course Title: Biofertilizers and Biopesticides
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to familiarize students with the scope of microbes as biofertilizers and biopesticides and the processes involved.*

Unit-I Introduction to Biofertilizers

1.1 Definition and status of biofertilizers, types of biofertilizers. Nitrogenous and phosphatic biofertilizers - *Rhizobium, Azotobacter, Azospirillum*, PSB/PSF (*Pseudomonas striata*, *Bacillus polymyxa*, *Bacillus megaterium*, *Aspergillus awamori* and *Penicillium* spp.)

1.2 Technologies for the production of biofertilizers. Quality control of biofertilizers.

1.3 Methods of inoculation on seed and in soil. BIS standards of biofertilizers and its economics,

1.4 Field programme of biofertilizers.

Unit – 2 Algae as Biofertilizer

2.1 Blue-green algae (Cyanobacteria) and their phages.

2.2 Algae as biofertilizers in rice cultivation, Azolla as biofertilizers, mass cultivation of algae, algal single cell protein.

2.3 Role of algae in municipal sewage waste treatment.

2.4 Vermiculture and vermicomposting.

SEMESTER III

Course Code:

Course Title: **Discipline Centric Elective**

Credits: 02

Duration of Course: 36 Hours

Total Marks: 50

Internal Assessment: 20

External Examination: 30

Duration of Exam: 02 Hours

LIST OF DISCIPLINE CENTRIC ELECTIVES (DCE)

S. No.	Paper Code	Paper Title	Course Type	Credits
1	Mib-3521	Biofertilizers and Biopesticides	DCE	2
2	Mib-3522	Analytical and Molecular Techniques	DCE	2

Note: Candidate has to opt only 1 course out of the 2 courses offered.

SEMESTER III

Course Code: Mib-3521
Course Title: Biofertilizers and Biopesticides
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to familiarize students with the scope of microbes as biofertilizers and biopesticides and the processes involved.*

Unit-1 Introduction to Biofertilizers

1.1 Definition and status of biofertilizers, types of biofertilizers. Nitrogenous and phosphatic biofertilizers - *Rhizobium, Azotobacter, Azospirillum*, PSB/PSF (*Pseudomonas striata*, *Bacillus polymyxa*, *Bacillus megaterium*, *Aspergillus awamori* and *Penicillium* spp.)

1.2 Technologies for the production of biofertilizers. Quality control of biofertilizers.

1.3 Methods of inoculation on seed and in soil. BIS standards of biofertilizers and its economics,

1.4 Field programme of biofertilizers.

Unit – 2 Algae as Biofertilizer

2.1 Blue-green algae (Cyanobacteria) and their phages.

2.2 Algae as biofertilizers in rice cultivation, Azolla as biofertilizers, mass cultivation of algae, algal single cell protein.

2.3 Role of algae in municipal sewage waste treatment.

2.4 Vermiculture and vermicomposting.

Unit – 3 Biopesticides

3.1 Mycorrhiza-VAM, synthesis of growth promoting substances. Role of biofertilizers in plant nutrition and integrated plant nutrient management (IPNM).

3.2 Isolation, characterization and mass propagation of VAM fungi. Problems and prospects.

3.3 Microbial pesticides - *Bacillus thuringensis*, mode of action and use.

3.4 Fungal and viral based biopesticides. Advantages and limitations of biopesticides.

Course Outcome

1. Development of understanding about Bio fertilizers, types of Bio fertilizers, production, field programme of Biofertilizers and its role in plant growth.
2. To provide a comprehensive study on the importance of Algae as biofertilizers, single cell protein and its role in sewage treatment.
3. To develop an understanding about processes like vermiculture and vermicomposting.
4. To provide an insight to the students about Biopesticides, production, mode of action and limitations.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Gregory, P.H. 1973. *The Microbiology of the Atmosphere*. Cambridge Univ. Press. London.
2. Lesinger, T. *et al.*, 1985. *Microbial Degradation of Xenobiotic and Recalcitrant compounds*. Academic Press. New York.
3. Mohapathra, P.K. 2008. *Textbook of Environmental Microbiology*. 2008. I.K. International Publishing House. New Delhi.
4. Suresh, G. 2007. *Envirnomental Studies and Ethics*. I.K. International Publishing House. New Delhi.
5. Tiwari, M., Khulbe, K. and Tiwari, A. 2007. *Environmental Studies*. I.K. International Publishing House. New Delhi.
6. Abbasi, S.A. 1998. *Environmental pollution and its control*. Cogent International publishers, Pondicherry.
7. Bhatia, A.L. 2010. *Textbook of Environmental Biology*. . I.K. International Publishing House. New Delhi

SEMESTER III

Course Code: Mib-3522
Course Title: Analytical and Molecular Techniques
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to familiarize the students with the fundamental aspects of analytical and molecular techniques as well as the use of techniques in the both basic research and in applied research*

Unit – 1 Chromatography and Spectroscopic Techniques

1.1 Properties of water and electrolytes; buffer; pH; Concentration terms; Quantitative biochemical measurements. Enzyme kinetics and Assays.

1.2 Protein structure, purification and characterization. Chromatographic techniques: Principle and applications of Adsorption, Partition, Ion-exchange, Size exclusion and Affinity chromatography; HPLC and FPLC.

1.3 *Overview and Applications of Spectroscopic Techniques*: Ultraviolet and visible light spectroscopy; Fluorescence spectroscopy; Light Scattering and Circular dichroism spectroscopy.

1.4 *Overview and Applications of Spectroscopic Techniques*: Infrared and Raman spectroscopy; Surface Plasmon Resonance; NMR and X-ray diffraction

Unit – 2 Electrophoretic, Centrifugation and Immunotechniques (*Overview and Applications only)*

2.1 Electrophoretic Techniques; Electrophoresis of proteins and nucleic acids; Capillary electrophoresis and Microchip electrophoresis.

2.2 Centrifugation: Basic principle of centrifugation; Preparative and Analytical Centrifugation; Mass spectrometry: MALDI-TOF; ESI-MS; Proteomics.

2.3 Radioisotopes and its usage in biochemical techniques. Immunochemical techniques: Production of Antibodies; Immunoassay and

Immunoelectrophoresis formats; Immunomicroscopy; Epitope mapping; Immunoblotting.

2.4 Fluorescence Activated Cell Sorting (FACS); Immunocapture PCR; Immunoaffinity chromatography; Biosensors and Antibody-based biosensors.

Unit – 3 Molecular Biology Techniques (*Principles and Applications only*)

3.1 Nucleic acid hybridization: Blotting techniques; Chemical Synthesis of DNA; DNA amplification by PCR; DNA libraries. DNA transfer into Eukaryotic Cells and Mammalian Embryos; Transgenic Animals; Determination of eukaryotic gene function by Gene Silencing or knockout.

3.2 PCR and its modifications: Nested PCR; Quantitative Real-time PCR; RT-PCR; Inverse PCR; Anchored PCR; RACE; Touchdown PCR; RAPD and AFLP; Labelling of Nucleic Acids: Isotopic and Non-Isotopic labelling; Molecular beacons; FISH; Colony hybridization; Phage display; Yeast- two hybrid assay.

3.3 Transcript Analysis; DNA Microarray; Electrophoretic mobility shift assay; Footprinting assay; Site- directed mutagenesis; Cassette mutagenesis; Primer extension method; Overlap extension method; Megaprimer PCR; Random mutagenesis.

3.4 DNA Sequencing; Chain termination method; automated sequencing; Chemical degradation method; Pyro sequencing. Next generation sequencing technologies: Illumina (Solex) sequencing; Ion torrent sequencing. Chromatin Immuno precipitation. (ChIP).

Course Outcome

1. To provide a detailed study about different biochemical techniques like enzyme assays, protein purification and characterization.
2. To develop an understanding about various chromatographic and spectroscopic techniques.

3. To provide an overview of electrophoretic and immunotechniques with special reference to radioisotopes.
4. To provide an insight about FACS, MALDI TOF, ESI-MS and Biosensors.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. E. H. Segel. *Biochemical Calculations: How to Solve Mathematical Problems in General Biochemistry*, 2nd Edition, John Wiley Publications.
2. Branden, C. and Tooze, J. (1999). *Introduction to Protein Structure*. Garland Publishing New York.
3. Tanford, C. (1961). *Physical Chemistry of Macromalocules*. John Wiley and Sons.
4. Wilson, K and Walker, J. (2011). *Principles and Techniques of Biochemistry and Molecular Biology*. Cambridge University press.
5. Friefilder, D. (1987). *Essentials of Molecular Biology*. Jones and Bartlett Publications.
6. Clark, D. P. (2005). *Molecular Biology: Understanding the Genetic Revolution*. Academic Press.
7. Nelson, D. D. L., Lehninger, A. L. and Cox, M. M. (2013). *Lehninger Principles of Biochemistry*. W.H. Freeman Publishers.

SEMESTER III

Course Code: Mib-3721
Course Title: Laboratory VII Immunology
Credits: 02
Duration of Course: 72 Hours

Total Marks: 50
Internal Assessment: 25
External Examination: 25

Course objectives: *The objective of this laboratory course is to develop working knowledge of the basic techniques, principles and procedures of immunology and serology.*

Immunology

1. To prepare soluble antigen by different methods.
2. To demonstrate various routes of immunization in mice.
3. To prepare serum and plasma from blood.
4. To precipitate immunoglobulins by ammonium sulphate and to determine total protein contents.
5. To determine Blood group and Rh factor by slide agglutination test.
6. To determine Total Leukocyte Count (TLC) for given blood sample.
7. To determine Differential Leukocyte Count (DLC) for given blood sample using Leishman stain.
8. To perform Widal agglutination test (slide and tube) for diagnosis of typhoid.
9. To perform Ouchterlony double diffusion test for detection of antigen and antibody reaction and to demonstrate relationship between antigens.
10. To perform Redial Immuno-diffusion test for detection of antigen and antibody reaction and for quantification of antigens.
11. To perform immune-electrophoresis for separation of antigens and for detection of antigen and antibody reaction
12. To perform Rocket Immuno-electrophoresis for detection of antigen and antibody reaction

13. To perform ELISA for assay of antibodies in serum sample against given antigen.

Course Outcome

1. To provide practical knowledge in various immunological procedures & techniques including plasma & serum preparation from blood, agglutination reactions and determination of Blood group and Rh factor etc.
2. To perform assays for the separation of antigens and for the detection of antigen antibody reactions.
3. To provide practical insights to immunization and various routes of immunization.
4. To perform and demonstrate TLC & DLC of given blood samples.

SEMESTER III

Total Marks: 50

Course Code: Mib-3722

Course Title: Laboratory VIII Industrial Microbiology and Fermentation Technology

Internal Assessment: 25

External Examination: 25

Credits: 02

Duration of Course: 72 Hours

Course Objectives: *The objective of this laboratory course is to provide practical skills on isolation and handling of industrially important microbes along with fermentation process.*

Industrial Microbiology and Fermentation Technology

1. Physical and chemical control of microbes: Sterilization.
2. Determination of thermal death point (TDP) of an Organism
3. Determination of thermal death time (TDT) of an Organism
4. Measurement of bacterial growth/growth curve.
5. Isolation of amylase producing microorganisms from Soil
6. Isolation of cellulase and pectinase producing microorganisms from vegetable and fruit waste.
7. Isolation of lipase producing microorganisms from butter.
8. Isolation of Protease producing microorganisms form soil
9. To demonstrate handling and sterilization of Fermenter.
10. To demonstrate strain improvement of industrially important bacteria or yeast by mutagenesis and selection of improved strains.

Course Outcome

1. This is to provide students with necessary knowledge about sterilization and different methods employed.

2. This course aims to train students to perform and demonstrate effects of Temperature on microbial growth and survival and to measure the Bacterial growth curve.
3. To provide hands on training to students regarding handling of fermenter and production of wine.
4. To isolate commercially important microorganisms like enzyme, antibiotics and penicillin producing microbes from their respective sources.

SEMESTER III

Course Code: Mib-3723 **Total Marks: 50**

Course Title: Laboratory IX Environmental Microbiology, Toxicology **Internal Assessment: 25**

External Examination: 25

Credits: 02

Duration of Course: 72 Hours

Course Objectives: *The objective of this laboratory course is to impart practical skills regarding quality assessment of air and water.*

Environmental Microbiology and Toxicology

1. Determination of Total Dissolve Solids (TDS) of given water sample.
2. Determination of chemical oxygen demand (COD) of given water sample.
3. Determination of Dissolved oxygen (DO) of given water sample.
4. Determination of BOD of given water sample.
5. Determination of total bacterial population by standard plate count technique.
6. Determination of the most probable number (MPN) of coliform bacteria in water
7. Microbiological analysis of water by membrane filter method.
8. Microbiological analysis of air for presence of (pathogenic) microorganisms in air.
9. Microbiological analysis of water for presence of (pathogenic) microorganisms.

Course Outcome

1. To perform various qualitative tests of water and air samples for the presence of total solids and (Pathogenic) microorganisms.
2. To provide practical understanding regarding Isolation, identification and enumeration of bacteria from different sources and determination of bacterial population by standard plate count.
3. To train students regarding Microbiological examination of water.

SEMESTER III

Course Code: Mib-3724 **Total Marks: 50**

Course Title: Laboratory X Food Microbiology **Internal Assessment:**

25 **Credits: 02**

External Examination: 25 **Duration of Course: 72 Hours**

Course Objectives: *The objective of this laboratory course is to familiarize students with the practical aspects of food microbiology and quality control measures.*

Food Microbiology

1. Microbiological examination of water, milk and milk products.
2. Enumeration of food borne bacteria.
3. Enumeration of food borne fungi
4. Detection and quantification of Aflatoxin-B1.
5. Detection of food-borne bacteria by immunoassays.
6. Detection and enumeration of microorganisms present on utensils.
7. Enumeration and quantification type of microorganisms present on fruit and vegetables.
8. Isolation and identification of pathogenic microorganisms from canned food.
9. Enumeration of bacteria in raw and pasteurized milk by SPC method.
10. Determination of quality of a milk sample by MBRT.
11. Detection of number of bacteria in milk by breed-count method.
12. Litmus milk test.
13. Microbiological examination of Ice cream and Dairy products.

Course Outcome

1. To perform various qualitative tests of water, milk and milk products.

2. To provide practical understanding regarding Isolation, identification and enumeration of food borne bacteria from different sources and determination of bacterial population by standard plate count.
3. To train students regarding Microbiological examination of water and food items including dairy products.
4. To perform immunoassays to detect food-borne bacteria.

SEMESTER IV

Course Code: Mib-4041
Course Title: Medical Microbiology
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

Course Objective: *The objective of this course is to familiarize students with the basic concepts in medical microbiology: Infection, Infectious agents and diagnosis.*

Unit-1 Introduction to Medical Microbiology

1.1 Infection: types of infection, sources of infection, reservoirs and vehicles of infection, predisposing factors.

1.2 Host-parasite relationship governing the infection and establishment of disease, factors affecting virulence.

1.3 Normal microflora of human body: normal flora of skin, respiratory, gastrointestinal, genital tract, role of resident flora, concept of probiotics.

1.4 Mode of spread of infection; Respiratory, skin, wound & burn infection, venereal infections, alimentary tract infection, blood born infection and nosocomial infection.

Unit – 2 Infection and Diagnosis

2.1 Properties of pathogenic microorganisms. Factors that influence pathogenicity.

2.2 Type of infections, source of infections, and different modes/means of infections.

2.3 Diagnostic microbiology – Types of specimen, specimen collection, transportation of specimen, processing, laboratory investigations, specific lab tests, non-specific lab tests, diagnosis and report.

2.4 Use of lab animals in diagnostic microbiology.

Unit – 3 Bacterial Infections

3.1 Infections caused by Gram positive cocci and Gram negative cocci: Source of infection, Pathogenicity, Epidemiology & Lab diagnosis of *Staphylococcus, Streptococcus* and *Neisseria* (meningitis, gonorrhea).

3.2 Infections caused by Gram-negative bacteria of family Enterobacteriaceae: Source of infection, Pathogenicity, Epidemiology & Lab diagnosis of *E. coli, Klebsiella, Proteus, Pseudomonas, Shigella dysenteriae* and *Salmonella typhi.*

3.3 Infection caused by Gram Positive bacilli: Source of infection, Pathogenicity, Epidemiology & Lab diagnosis of *Corynebacterium diphtheriae, Bacillus anthracis, Clostrodium tetani, Vibrio cholerae.*

3.4 Disease caused by acid-fast bacteria and intracellular bacteria: Source of infection, Pathogenicity, Epidemiology & Lab diagnosis of *Mycobacterium tuberculosis, Mycobacterium leprae, Rickettsia* and *Chlamydia.*

Unit – 4 Viral Infections

4.1 Viral infections of the upper respiratory tract: Rhinovirus and Adenoviral infections. Viral infections of the lower respiratory tract: Influenza and Paramyxovirus infections.

4.2 Viral infections of Skin: Herpes simplex virus, Chickenpox, Human Herpes virus 6; Rubella virus infections.

4.3 Viral infections of Blood: Herpes virus, Hepatitis virus, Flavivirus infections and that caused by members of Filoviridae.

4.4 Viral infections of GIT: Hepatitis virus A and E; Viral Gastroenteritis; Viral infections of Nervous system: Rabies virus; poliovirus infections and Arboviral Encephalitis.

Unit-5 Protozoal, Fungal and Other Infections

5.1 Important protozoal diseases: Route of entry, Life Cycles, Immunity, disease produced, diagnosis & prophylaxis of *Plasmodium vivax, P. falciparum, P. malariae* (Malaria), *Entamoeba histolytica & Entamoeba coli* (amoebiasis).

5.2 Route of entry, Life Cycles, Immunity, disease produced, diagnosis & prophylaxis of *Leishmania, Trypanosoma* and *Toxoplasma.*

5.3 Fungal infections: description & classification of pathogenic fungi, Infection caused by dermatophytes (Microsporum, Trichophyton & Epidermatophyton).

5.4 Definition, Causative agent, Source of infection, Epidemiology, Symptomatology & Diagnosis of Candidiasis, Aspergillosis and Histoplasmosis.

Course Outcome

1. To enhance the understanding for Infections, its sources and modes of spreading.
2. To acquaint students with the concept of pathogen and factors influencing pathogenicity and its diagnosis.
3. To develop an understanding about infections caused by different microbes like viruses, bacteria, protozoa and fungi, its pathogenicity and diagnosis.
4. To acquaint students with the understanding of various diagnostic procedures like specimen collection, lab testing, diagnosis and report

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.

2. Pelczar, (Jr.) M. J., Chan, E. C. S. and Kreig, N. R.1993. *Microbiology*. McGraw Hill, New York.

3. Presscott, L. M. Harley, J. P. and Klein, D. A. 1999. *Microbiology*, International edn. 4th edn. WCB Mc Graw-Hill.

4. Schaechter, M. Ingraham, J.L. and Neidhardt, F.C. 2006. *Microbe*. ASM Press, Washington, D.C.

5. M.T. Madigan, J.M. Martinko and J. Parker, *Brock Biology of Microorganisms,* Ninth edition, Prentice Hall, Upper Saddle River, NJ.

6. Jawetz, Melnick, & Adelberg's, *Medical Microbiology;* Fifth edition, MacGraw Hills

7. Ananthnarayanan and Paniker *Textbook of Microbiology;* Eighth edition, Universities Press.

SEMESTER IV

Course Code: Mib-4042
Course Title: Agricultural Microbiology
Credits: 04
Duration of Course: 72 Hours

Total Marks: 100
Internal Assessment: 40
External Examination: 60
Duration of Exam: 03 Hours

Course Objective: *The objective of this course is to impart knowledge about the interactions between microbe and soil system and importance of microorganisms for sustainable agriculture.*

Unit -1 Soil Microorganism, Microbial Interaction and Role in Nutrient Recycling

1.1 Microorganisms of soil

1.2 Rhizosphere and phyllosphere microflora

1.3 Brief account of Microbial interactions: antagonism, symbiosis, mutualism, commensalisms, synergism and parasitism.

1.4 Nutrient cycle: Carbon cycle, nitrogen cycle, phosphorous cycle and sulphur cycle.

Unit – 2 Plant Diseases

2.1 Role of enzymes and toxins in pathogenesis.

2.2 Fungal diseases of plants: Rusts of wheat, linseeds; late blight of potato; red rot of sugarcane.

2.3 Bacterial diseases of plants: Citrus canker, blight of rice

2.4 Viral diseases of plants: Leaf curl of Papaya, vein clearing of lady's finger

Unit – 3 Physical, Chemical and Microbial Control of Plant Diseases

3.1 Physical and chemical control of plant diseases.

3.2 Bacterial control of insect pests: *Bacillus thuringiensis* as bacterial insecticide.

3.3 Viral control of insect pests: Nuclear polyhedrosis viruses (NPV) and cytoplasmic polyhedrosis viruses (CPV)

3.4 Fungal control of insect pests: Entomopathogenic fungi: *Metarhinium anisopliae, Beauveria bassiana, Verticillium lecani, Hirsutella thompsoni.*

Unit – 4 Microbial Effects on Storage of Agricultural Product

4.1 Storage fungi: Categories of storage fungi, conditions during storage in relation to damage of seeds, harmful effects.

4.2 Mycotoxins and their effect on human being.

4.3 General idea about quarantine.

4.4 Production of biogas and alcohol from agricultural wastes.

Unit – 5 Agricultural Applications of Microbes

5.1 Biofertilizers: Types, production and application.

5.2 Mycorrhizae: Types and their application in agriculture and forestry.

5.3 Vermicomposting.

5.4 Reclamation of waste agricultural land by microorganisms.

Course Outcome

1. To familiarize students with the study of soil microbes, various microbial interactions, different nutrient cycles and vermicomposting.
2. To acquaint students with the idea of plant diseases, their causative agents and their control.
3. To develop an understanding about storage fungi and Mycotoxins and their effects on seeds and humans resp.
4. Types and production of Biofertilizers, Mycrorhhizae and reclamation of soil by Microbes.

3.2 Bacterial control of insect pests: *Bacillus thuringiensis* as bacterial insecticide.

3.3 Viral control of insect pests: Nuclear polyhedrosis viruses (NPV) and cytoplasmic polyhedrosis viruses (CPV)

3.4 Fungal control of insect pests: Entomopathogenic fungi: *Metarhinium anisopliae, Beauveria bassiana, Verticillium lecani, Hirsutella thompsoni.*

Unit – 4 Microbial Effects on Storage of Agricultural Product

4.1 Storage fungi: Categories of storage fungi, conditions during storage in relation to damage of seeds, harmful effects.

4.2 Mycotoxins and their effect on human being.

4.3 General idea about quarantine.

4.4 Production of biogas and alcohol from agricultural wastes.

Unit – 5 Agricultural Applications of Microbes

5.1 Biofertilizers: Types, production and application.

5.2 Mycorrhizae: Types and their application in agriculture and forestry.

5.3 Vermicomposting.

5.4 Reclamation of waste agricultural land by microorganisms.

Course Outcome

1. To familiarize students with the study of soil microbes, various microbial interactions, different nutrient cycles and vermicomposting.
2. To acquaint students with the idea of plant diseases, their causative agents and their control.
3. To develop an understanding about storage fungi and Mycotoxins and their effects on seeds and humans resp.
4. Types and production of Biofertilizers, Mycrorhhizae and reclamation of soil by Microbes.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Recommended Textbooks and References:

1. *Plant-microbe interactions and biological control* Volume 63 of Books in soils, plants, and the environment by Greg J. Boland, L. David Kuykendall
2. *New Perspectives and Approaches in Plant Growth-Promoting Rhizobacteria* Research by Philippe Lemanceau, Peter Bakker & Jos Raajimakers.
3. Ghosh, A. 2003. *Natural Resource Conservation and Environment Management*. Aph Publishing Corp. Calcutta.
4. Stanley J.T. And Reysenbach A.L.1977. *Biodiversity of microbial life*. John Wiley 7 Sons Inc. Publication. New York.
5. *Biological control of crop diseases* Volume 89 of Books in soils, plants, and the environment by S.S. Gnanamanickam.
6. N.S. Subba Rao, *Soil Microbiology* Fourth edition, Oxford and IBH Publishing Co. Pvt., Ltd., New Delhi.
7. Alexander M. (1977) *Introduction to soil microbiology*. John Wiley & Sons, Inc., New York.

SEMESTER IV

Course Code: Mib-4021
Course Title: Bioinformatics
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to introduce students to the rapidly evolving field of bioinformatics that will help the students to gain an understanding of the computational challenges (and their solutions) in the analysis of large biological data sets.*

Unit -1 Introduction to Computers

1.1 Computer fundamentals and organization: Central processing unit, Arithmetic unit, Primary and secondary memory.

1.2 Computer software & hardware (definition, relationship between software and hardware), Types of software.

1.3 Operating system: concept and functions, Introduction to Microsoft Office (MS-word, MS-Excel and MS-PowerPoint).

1.4 Application of computers in biological research, Internet: definition and practical utility.

Unit-2 Bioinformatics -I

1.1 Introduction and branches of Bioinformatics. Aim, scope and research areas of Bioinformatics.

1.2 Databases in Bioinformatics: Introduction, Biological databases, Classification format of biological databases.

1.3 Biological Sequence Databases: National Center for Biotechnology Information (NCBI): Tools and Databases of NCBI, Sequence Retrieval tool, Sequence Submission to NCBI, Sequence analysis tools.

1.4 Protein Database: Protein Information Resource (PIR): Resources of PIR, Databases of PIR, Data Retrieval in PIR. Swiss-Prot: Introduction and salient features.

Unit-3 Bioinformatics-II

2.1 Primer designing: Concept, design, and applications of primer for use in PCR-based diagnosis of the disease.

2.2 Computational methods for sequence analysis: Pairwise and multiple sequence alignment for DNA and protein sequences.

2.3 Tools for similarity search and sequence alignment: BLAST and types, FASTA.

2.4 Genome analysis and Gene identification: Sequencing, Assembly, and Annotation. Molecular Phylogeny: Concept and principle, Software's for Phylogenetic Analysis and Prediction.

Course outcome

1. The students will be able to describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches, and analyze and discuss the results in light of molecular biological knowledge.
2. The students will be able to explain the major steps in pairwise and multiple sequence alignment, explain the principle for, and execute pairwise sequence alignment by dynamic programming.
3. The aim is to provide practical training in bioinformatics methods including accessing the major public sequence databases, use of the different computational tools to find sequences, analysis of protein and nucleic acid sequences by various software packages.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. A.D. Baxevanis and B.F.F. Ouellette (Eds). (2002). *Bioinformatics: a Practical Guide to the Analysis of Genes and Proteins*. John Wiley and Sons.
2. D.W. Mount. (2001). *Bioinformatics: Sequence and Genome Analysis*. Cold Spring Harbor Laboratory Press.
3. Jones & Peuzner. (2004); *Introduction to Bioinformatics Algorithms;* Ane Books, India.
4. M Campbell A. M., Heyer L. J. (2006) *Discovering Génomics, Proteomics and Bioinformatics* II Edition. Benjamin Cummings.
5. Ghosh Z. and Bibekanand M. (2008) *Bioinformatics: Principles and Applications*. Oxford University Press.
6. Pevsner J. (2009) *Bioinformatics and Functional Genomics*. II Edition. Wiley-Blackwell.
7. Web-resources and suggested reviews/ research papers.

SEMESTER IV

Course Code:

Course Title: Discipline Centric Elective

Credits: 02

Duration of Course: 36 Hours

Total Marks: 50

Internal Assessment: 20

External Examination: 30

Duration of Exam: 02 Hours

LIST OF DISCIPLINE CENTRIC ELECTIVES (DCE)

S. No.	Paper Code	Paper Title	Course Type	Credits
1	Mib-4521	Nanotechnology	DCE	2
2	Mib-4522	Genetic Engineering	DCE	2

Note: Candidate has to opt only 1 course out of the 2 courses offered.

SEMESTER III

Course Code: Mib-4521 | **Total Marks: 50**

Course Title: Nanotechnology | **Internal Assessment: 20**

Credits: 02 | **External Examination: 30**

Duration of Course: 36 Hours | **Duration of Exam: 02 Hours**

Course Objectives: *The objective of this course is to familiarize students with the basic concepts of Nanomaterials and Nanotechnology and its Applications.*

Unit - 1 Introduction to Nanotechnology

1.1 Definition; Evolution of Nanoscience; Need of Nanotechnology; Hurdles for Nanotechnology development.

1.2 Factors affecting the manufacturing process of nano materials – Role of physicists, chemists, medical doctors, engineers, biologists and computer scientists in nanotechnology.

1.3 Spectroscopy– the tool used in nanotechnology research: Infra red spectroscopy, Raman spectroscopy, Ultra violet-visible spectroscopy.

1.4 Microscopy: Atomic force microscope; Scanning electron microscope; Transmission electron microscope; Scanning tunnelling microscope and Magnetic resonance force microscopy.

Unit – 2 Nanomaterials and its Applications

2.1 Nanocrystals: Quantum dot as Biological fluorescent tag; Bucky balls for medical imaging; Gadolinium for Magnetic resonance imaging; Dendrimers in molecular imaging.

2.2 Nanoprobes for nucleic and hybridization detection, Nucleophilic carbenes. Working on the DNA chain gangs. DNA and protein-based Nano-circuitry.

2.3 Nanotechnology for drug development and medical applications. Nanotechnology for drug solubilization and drug delivery.

2.4 Diagnosis using nanomaterials. Development and uses of bio-motors for engineered devices.

Unit – 3 Applications of Nanotechnology in Therapy and Environment Management.

3.1 Nano therapy for cancer treatment: Radioactive tuberin cages in nuclear medicine. Interior expansion of arteries or block removal; Uses of nanomaterials in joint replacements.

3.2 Cleaner environment with Nanotechnology: Cleaning the air with Nanotechnology; Nanotechnology for water treatment.

3.3 Microbial nanoparticles. Use of nanocarbon ball as deodorizer in fermentation process.

3.4 Possible harm from nanomaterials. Nanoscience in India; Nanoscience education abroad: Looking at ethics and society.

Course outcome

1. The course will provide an understanding of nanomaterials and techniques employed to study them.
2. To familiarize students with the application of nanotechnology in medicine.
3. To provide understanding about the emerging usage of nanomaterials in therapeutics and in environment management.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Richard Brooker and Earl Boysen (2006). Nanotechnology. Wiley Publishing Inc., India. Pp 361.

2. Paul Dieppe and Paul Calvert. (1983). Crystals and Joint disease, Chapman and Hall Ltd, London.

3. Duckruix, A. and R. Giege, (1992). Crystallization of Nucleic acids and Proteins. A practical approach, Oxford University Press, England.

SEMESTER IV

Course Code: Mib-4022
Course Title: Genetic Engineering
Credits: 02
Duration of Course: 36 Hours

Total Marks: 50
Internal Assessment: 20
External Examination: 30
Duration of Exam: 02 Hours

Course Objectives: *The objective of this course is to familiarize the students with the basic concepts in genetic engineering and to acquaint the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology.*

Unit – 1 Genetic Engineering Techniques - I

1.1 Definition, brief history and scope of genetic engineering; Milestones in the development of genetic engineering as technology.

1.2 Molecular tools employed in genetic engineering: restriction enzymes-types, nomenclature and cleavage patterns; concept of linkers and adapters, ligases-types and nature of action.

1.3 Cloning Vectors for prokaryotes: properties of an ideal vector, plasmid vectors-pBR322 vectors, pUC8 vectors, M13 bacteriophage vectors, cosmids and shuttle vectors.

1.4 Cloning vectors for eukaryotes: Yeast integrative plasmids (YIps), Yeast artificial chromosome vectors (YAC) and bacterial artificial chromosome (BAC) vectors.

Unit – 2 Genetic Engineering Techniques – II

2.1 Gel electrophoresis: Agarose, pulsed field and PAGE, Blotting techniques: Northern blotting, Southern blotting and Western blotting (Overview).

2.2 Polymerase Chain Reaction: principle, applications and importance; variation in PCR.

2.3 Genomic/cDNA libraries – construction, screening and choice of vectors.

2.4 DNA sequencing – chemical degradation and enzymatic methods, Automatic DNA Sequencers; DNA Fingerprinting – technique and applications.

Unit – 3 Applications of Genetic Engineering

3.1 Gene transfer in animal cells, various methods used including transfer and particle bombardment mediated gene transfer.

3.2 Transgenic animal models and their significance for human welfare.

3.3 Gene therapy: introduction and its applications in human diseases (ADA and CFTR).

3.4 Production of recombinant proteins: Recombinant insulin, Human growth hormone and Recombinant Factor VIII.

Course outcome

1. The students will have knowledge of tools and strategies used in genetic engineering.
2. Understanding of applications of recombinant DNA technology and genetic engineering from academic and industrial perspective.
3. Can use and apply the knowledge of genetic engineering in problem solving and in practice.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Recommended Textbooks and References:

1. Brown, T. A (2010) *Gene cloning and DNA Analysis: An Introduction*, Wiley-Blackwell Publication

2. Brown, T. A. (2006). *Gene Cloning – An Introduction.* Blackwell Publishing. (5th edition).

3. Clark, D. P. (2005). *Molecular Biology: Understanding the Genetic Revolution.* Academic Press.

4. Davies, J. A. and Reznikoff, W.S. (1992). *Milestones in Biotechnology, Classic Papers on Genetic Engineering.* Butterworth – Hienemann, Boston.

5. Kingsman, S. M. and Kingsman, A. J. (1998). *Genetic Engineering: An Introduction to Gene Analysis and Exploitation in Eukaryotes.* Blackwell Scientific Publications, Oxford.

6. Walker, M. R. and Rapley, R. (1997). *Route Maps in Gene Technology,* Blackwell Science Ltd, Oxford.

7. Williams, J., Ceccarelli, A. and Wallace, A. (2001). *Genetic Engineering; Second Edition.* Springer– Verlag, New York Inc.

SEMESTER IV

Course Code: Mib-4721 | **Total Marks: 50**

Course Title: Laboratory XI Medical Microbiology | **Internal Assessment: 25**

Credits: 02 | **External Examination: 25**

Duration of Course: 72 Hours

Course Objectives: *The objective of this course is to provide opportunities for students to develop diagnostic skills in medical microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases*

Medical Microbiology

1. To prepare various basic, selective, enrichment and enriched media used for isolation of medically important bacteria from clinical samples.
2. To perform sugar fermentation tests used for identification of medically important bacteria.
3. Preparation of transport media for different clinical samples.
4. Demonstration normal microbial flora of skin, mouth and throat.
5. Isolation and identification of Staphylococcal species using suitable media, staining techniques and biochemical tests.
6. Identification of bacterial species belonging to Enterobacteriaceae family using suitable biochemical tests (*E. coli, Proteus, Pseudomonas, and Klebsiella*).

Course outcome

1. To provide practical knowledge on Isolation and Identification of medically important bacteria using suitable media, staining techniques and Biochemical tests.
2. To perform microbiological examinations of different human-based samples like urine and sputum.
3. To acquaint students with the practical skills regarding antibiotic sensitivity of bacteria and to determine MIC of any antibiotic against the test bacteria.
4. To provide an understanding about antibiotic resistance in bacteria.

SEMESTER IV

Course Code: Mib-4722 **Total Marks: 50**

Course Title: Laboratory XII Agricultural Microbiology **Internal Assessment: 25**

Credits: 02 **External Examination: 25**

Duration of Course: 72 Hours

Course Objectives: *The objective of this course is to provide practical knowledge in the isolation and characterization of crop & soil associated microbes as well as to understand the plant-pathogen interaction*

Agricultural Microbiology

1. To study viral diseases in plants.
2. To study bacterial and fungal diseases in plants.
3. Isolation of rhizobia from root nodules of leguminous plants.
4. Testing of nodulation ability of rhizobia.
5. Inoculation of seeds with rhizobia.
6. To study pesticidal activity of *Bacillus thuringiensis*.
7. Isolation of VAM spores from soil.
8. Isolation of *Azotobacter* species from soil.
9. Isolation of microorganisms from rhizosphere.

Course Outcome

1. To acquaint students with the study of viral, bacterial and fungal diseases in plants and isolation & characterization of Rhizobia.
2. Isolation and characterization of microorganisms from soil (rhizosphere) and pesticidal activity of *Bacillus thurengenesis*.

SEMESTER IV

Course Code: Mib-4723
Course Title: Laboratory XII Bioinformatics
Credits: 02
Duration of Course: 72 Hours

Total Marks: 50
Internal Assessment: 25
External Examination: 25

Course Objectives: *The objective of this course is to provide practical knowledge on the use of various bioinformatics tools: nucleotide similarity searches, phylogenetic analysis etc.*

1. Determination of protein parameters from available softwares.
2. Retrieval of nucleotide and protein sequences from suitable databases.
3. Determination of protein sequence from nucleotide sequence using available softwares.
4. Study similarity searches using BLAST.
5. Designing primers using online softwares.
6. Studying the alignment of DNA and protein sequences by using bioinformatics tools.
7. Construction of phylogenetic tree of available data (protein and DNA sequences) by using available softwares.
8. Studying the structure of different proteins to appreciate differences and similarities among them using available softwares.

Course Outcome

1. To acquaint students with the basics of bioinformatics as an analytical tool.
2. To impart skill based knowledge on the computational aspects of Biological analysis.
3. Determination & retrieval of protein sequences by suitable databases.
4. Construction of phylogenetic tree and sequence similarity searches by suitable softwares like BLAST.

Syllabus: MGP

Syllabus for M.A. Gojri& Pahari
at
Baba Ghulam Shah Badshah University
Rajouri (J&K)

CENTRE FOR RESEARCH IN GOJRI, PAHARI & KASHMIRI LANGUAGES
School of Islamic Studies & Languages
BABA GHULAMN SHAH BADSHAH UNIVERSITY
RAJOURI (J&K)-185234

Introduction:

Baba Ghulam Shah Badshah University is located at the foothills of the great Himalayan Pir Panjal range in Rajouri district. The major languages spoken in the Pir Panjal region are Gojri and Pahari. It's a matter of great justice for a University to promote, propagate and conserve the languages which is spoken most in the region where it is located.

Most of the time, languages go extinct because their speakers are absorbed by a dominant language or culture group. The Pirpanchal Region of Jammu & Kashmir is the Central Province for Pahari &Gojri languages. **Gojri** is the mother tongue of over 20 million people residing in various parts of India particularly in Jammu & Kashmir, Himachal Pradesh, Rajasthan, Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh, Gujarat and Uttarakhand. It is an offshoot of Indo-Aryan Group of languages and it has been used by several noted poets and Sufi saints to spread their message during the dawn of Sanskrit and Persian poetry and prose in the Indian sub-continent. Noted poet-musician Hazrat Amir Khusro formally made mention of the Gojri language in the list of eight Indian languages of his time.

Pahariis used for a variety of languages, dialects and language groups, normally found in the lower Himalayas. *The Pahari language spoken in Pir Panchal region of J&K has not been studied systematically and thus not included in this classification. However,* Pahari is widely spoken in the Himalayan Region and is an Indo-Aryan branch of languages. The Paharis, are historically ancient, having been mentioned by the authors like Pliny and Herodotus and figuring in India's epic poem, the Mahabharata.

Inspired by the New Education Policy 2020, the Jammu & Kashmir Government is all set to introduce Gojri& Pahari at School and College levels UG and PG levels as also in institutions of Higher Education. In this backdrop; the scope and significance of the '**M.A. Programme in Gojri& Pahari at BGSBU**' increases many- fold.

Course Structure for MA in Gojri & Pahari

[4 semesters]

SEMESTER I

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**University Examination**	**Total**
MGP-101	History of Gojri & Pahari Civilization	4	40	60	100
MGP -102	Gojri& Pahari Culture & Traditions	4	40	60	100
MGP -103	History of Gojri& Pahari Languages	4	40	60	100
MGP -104	Gojri& Pahari Folklore	4	40	60	100
MGP -105	Applied Gojri& Pahari Linguistics	4	40	60	100
Total		20			500

SEMESTER II

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**University Examination**	**Total**
MGP -201	Modern Gojri& Pahari Literature	4	40	60	100
MGP -202	Classical Gojri& Pahari Poetic Genres	4	40	60	100
MGP -203	Modern Gojri& Pahari Poetic Genres	4	40	60	100

MGP -204	**Modern Gojri& Pahari Prose**	4	40	60	100
Elective Course	Choice Based OpenElective Course from Other Disciplines	4	40	60	100
MGP -205	Introduction to Gojri Language & Literature	4	40	60	100
MGP -206	Introduction to Pahari Language & Literature	4	40	60	100
MGP -207	Introduction to Kashmiri Language& Literature	4	40	60	100
Total		20			500

SEMESTER III

Course Code	**Course Title**	**Credits**	**Distribution of Marks**		
Courses:			**Sessional Assessment**	**University Examination**	**Total**
MGP -301	Jadid Gojri& Pahari Ghazal	4	40	60	100
MGP -302	Jadid Gojri& Pahari Nazm	4	40	60	100
MGP -303	Jadid Gojri& Pahari Afsana	4	40	60	100
MGP -304	Gojri& Pahari Drama& Novel	4	40	60	100
CBCS Electives	Any one of following Electives		40	60	100
MGP -305	Special Study of Iqbal Azeem	4	40	60	100
MGP -306	Special Study of Sabir Mirza	4	40	60	100
Total		20			500

SEMESTER IV

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**University Examination**	**Total**
MGP -401	Gojri& Pahari AdabiTehqeeq (Research)	4	40	60	100
MGP -402	Gojri& Pahari AdabiTanqeed (Criticism)	4	40	60	100
MGP -403	Non-Fictional Prose &Sahafat	4	40	60	100
MGP -404	GojriTarjuma Nigari	4	40	60	100
MGP -405	Dissertation/ Project Report	4	40	60	100
Total		20			500

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SEMESTER I

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**University Examination**	**Total**
MGP-101	History of Gojri& Pahari Civilization	4	40	60	100
MGP -102	Gojri& Pahari Culture & Traditions	4	40	60	100
MGP -103	History of Gojri& Pahari Languages	4	40	60	100
MGP -104	Gojri& Pahari Folklore	4	40	60	100
MGP -105	Applied Gojri& Pahari Linguistics	4	40	60	100
Total		20			500

Semester-I**

COURSE TITLE: History of Gojri& Pahari Civilization **Maximum Marks: 100**
COURSE CODE: MGP-101 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-101 COURSE TITLE: History of History of Gojri& Pahari Civilization		
	UNIT I: Historiography	**یونٹ 1:** تاریخ کو علم	
	• Definition and Origin	تاریخ کی تعریف تے تاریخ لکھن کی شروعات	
	• Early development	تاریخ کا علم کی ترقی تے ترویج	
	• Scope and Significance	تاریخ کا علم کی ضرورت تے اہمیت	
	UNIT II: Gujjars in Medieval India	**یونٹ 2:** ہندوستان ما، گوجر	
	• Origin &Early Settlements	گوجراں کو اصلی وطن تے پہلی بستیں	
	• Golden Period	ہندوستان ما گجراں کو سنہری دور	
	• Causes & Consequences of Decline	گجراں کا زوال کی وجہ تے اثرات	
	UNIT III: Migration & New Destinations	**یونٹ 3:**گجرات توں ہجرت تے نویں منزل	
	• New Destinations in Indian Subcontinent	بر صغیر ما گجراں کی نویں بستیں	
	• Gujjars of Jammu & Kashmir	جموں کشمیر کا گوجر: علاقہ تے گروہ	
	• Present Status	موجودہ صورتحال	
	UNIT IV: Pahari People: Historical Background	**یونٹ 4:پہاڑی قوم نا تاریخی پس منظر**	
	• Pahari People: An Introduction	پہاڑی قوم نا تعارف	
	• Paharis through the ages	پہاڑی قوم نا تاریخی سفر	
	• The Golden Period of Pahari Civilation	پہاڑی قوم نا، زریں زمانہ (شاردا تہذیب)	
	UNIT V: Pahari People: Contemporary Scenario	**یونٹ 5: پہاڑی قوم نی موجودہ صورتحال**	
	• Paharis in Jammu & Kashmir	جموں کشمیر بچ پہاڑیاں نے علاقے تے بستیاں	
	• Pahari Diaspora	بیرون ملک پہاڑی بستیاں	
	• Contemporary Scenario	موجودہ صورتحال	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-101		
		مقدمه ابن خلدون	
		راج ترنگنی	
		تاریخ کشمیر محمد دین فوق	
		تاریخ اقوام پُونچھ محمد دین فوق	
		ضیاء البیان: مفتی عبد الغنی شاشی	
		شاردا تاریخ: راجه نذر بونیاری	
	جموں اینڈ کشمیر آف آرٹ ، کلچر اینڈ لینگویجز	شیرازہ پہاڑی پہاڑی قبائل	
	جموں اینڈ کشمیر آف آرٹ ، کلچر اینڈ لینگویجز	شیرازہ پہاڑی راجوری نمبر	
		پہاڑی قبیلے - کے - ڈی۔ مینی	
	The PaharisEthnography :Shakeel-ur-Rehman		

Semester-I

COURSE TITLE: Gojri& Pahari Culture & Traditions **Maximum Marks: 100**
COURSE CODE: MGP-102 **University Examination: 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 2 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-102 **COURSE TITLE:** Gojri& Pahari Culture & Traditions		
	UNIT I: History of Culture & Civilization:	**تہذیبی تے ثقافتی تاریخ یونٹ 1**	
	• **Civilization: Definition & Origin**	: تہذیب: تعریف تے ابتدا	
	• Major Civilizations of World	دنیا کی معروف تہذیب	
	• Contemporary Scenario/ globalization	موجودہ صورتحال: اک جائزو	
	UNIT II: Gujjar Culture & Traditions	**یونت 2: گوجری تہذیب تے ثقافت**	
	• Medieval culture & Traditions	گجراں کی قدیم تہذیب تے تمدن	
	• Influence of other cultures on Gujjars	گوجری تہذیب ور مختلف تہذیباں کا اثرات	
	• Influence of Gujjars on other cultures	مختلف تہذیباں ور گوجری تہذیب کا اثرات	
	UNIT III: Gujjar Culture of Jammu & Kashmir	**یونت 3: جموں کشمیر کی گوجر تہذیب**	
	• Denominations of Gujjars:	گجراں کی شاخ : مقامی تے خانہ بدوش	
	• Habitat &Livelihood	رہن سہن تے خوراک	
	• Customs and Costumes	رسم رواج تے پوشاک	
	UNIT IV: Ancient Pahari Civilization	**یونت 4: قدیم پہاڑی تہذیب**	
	• Historical Background	پہاڑی تہذیب نا تاریخی پچھوکڑ	
	• Pahari Civilization & Fine Arts	پہاڑی ثقافت، تے فنون لطیفہ	
	• Pahari Customs & Costumes	پہاڑی قوم نے رسم و راج	
	UNIT V: Pahari People in J&K	**یونت 5: جموں کشمیر کی پہاڑی تہذیب**	
	• A Study of Pahari Customs	پہاڑی رسم و رواج نا مطالعہ	
	• Influence of other Civilization on Pahari	پہاڑی تہذیب اپر دیگر تہذیباں نے اثرات	
	• Modern trends in Pahari Civilization	پہاڑی کلچر نے بدلنے رُجحان	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	Recommended Books :COURSE CODE: MGP-102		
		مشترکہ تہذیب اور اردو ادب: ڈاکٹر شہناز قادری	
		لغات گجری: نجیب اشرف ندوی	
		گوجر، گوجری زبان و ادب: رام پرشاد کھٹانہ	
		گوجر شناخت کا سفر: ڈاکٹر جاوید راہی	
		گوجر ہمالیائی انسائیکلو پیڈیا:جاوید راہی	
		استا ادب (ثقافت نمبر) کلچرل اکیڈمی	
		مہارو ادب (ثقافت نمبر) کلچرل اکیڈمی	
		نثر بہار: منشاء خاکی	
		پہاڈی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		گوجری زبان کی سنہری تاریخ: ڈاکٹر رفیق انجم	
		گوجری کہاوت کوش: ڈاکٹر رفیق انجمؔ	

Semester-I

COURSE TITLE: History of Gojri& Pahari Languages
COURSE CODE: MGP-103**
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Examination: 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-103 COURSE TITLE:** History of Gojri& Pahari Languages		
	UNIT I: Linguistics: General Introduction	**یونٹ 1**:لسانیات کو علم	
	• Language: Definition & development	زبان کی تعریف تے ابتدا	
	• Linguistic Classification	زبان کی اہمیت، زبان اور بولی کا فرق	
	• Classification of Indian Languages	ہندوستانی زباناں کی لسانی درجہ بندی	
	UNIT II: Medieval GojriLiterature	**یونٹ 2**: قدیم گوجری ادب	
	• Origin & Development	قدیم گوجری کی شروعات	
	• Theories of Historians	تاریخ داناں کا نظریات: جمیل جالبی	
	• Medieval Gojri Poets: Khusro, Kabir, Mira Bai, Amin Gujrati	قدیم گوجری شاعر: امیر خسرو، بھگت کبیر، میرا بائی، امین گجراتی	
	UNIT III: Modern GojriLiterature (20th Century)	**یونٹ 3**: جدید گوجری ادب	
	• Renaissance & Phases of development	گوجری زبان تے ادب کا دور	
	• Role of Governmental institutions	جدید گوجری ادب کی ترقی ما سرکاری اداراں کو رول	
	• Role of NGOS in development of Gojri	جدید گوجری کی ترقی ما غیر سرکاری اداراں کو رول	
	UNIT IV: Pahari Linguistics-I	**یونٹ 4**: **پہاڑی لسانیات 1**	
	• Pahari Language: Theories of Origin	پہاڑی زبان نی شروعات تے نظریے	
	• Provinces of Pahari	پہاڑی زبان تے علاقے	
	• Characteristics & Dialects of Pahari	پہاڑی زبان نی انفرادیت تے بکھ بکھ لہجے	
	UNIT V: Pahari Linguistics-II	**یونٹ 5**: **پہاڑی لسانیات 2**	
	• Classical Pahari Poetry	پہاڑی زبان نا کلاسیکی ادب	
	• Modern Literary Movement	جدید پہاڑی ادب نی تحریک	
	• Role of Institutions in development	پہاڑی زبان نی ترقی وچ مختلف اداریاں نا رول	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**103**		
		مسعود حسین خان مقدمه تاریخ زبان اردو	
		رام بابو سکسینه اردو ادب کی تاریخ	
		اردو ادب کی تاریخ: گیان چند جین، سیده جعفر	
		گوجر، گوجری زبان و ادب: ڈاکٹر رام پرشاد کھٹانه	
		گوجری ادبیات: ڈاکٹر رفیق انجمّ	
		پہاڑی زبان و ادب دی تاریخ: راجه نذر بونیاری	
		شیرازه پہاڑی(زبان نمبر) کلچرل اکیڈمی	
		شیرازه گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-I

COURSE TITLE: Gojri& Pahari Folklore
COURSE CODE: MGP-104
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-104COURSE TITLE: Gojri& Pahari Folklore	گوجری تے پہاڑی لوک ادب	
	UNIT I: Introduction to Folklore	**یونٹ 1**: لوک ادب: اک تعارف	
	• Definition & Types	لوک ادب، تعریف تے قسم	
	• Songs & Ballads	شعری لوک ادب: لوک گیت، لوک بار	
	• Folk Tales	نثری لوک ادب:لوک کہانیں، محاورے، اکھان، بجھارت	
	UNIT II: Gojri Folklore	**یونٹ 2**: گوجری لوک ادب	
	• Historical Background (1700-1900CE)	تاریخی پس منظر تے قِسم	
	• Social & Seasonal Songs	خوشی غمی کا گیت تے موسمی گیت	
	• Stories of Vallour& Love: Barsio/ Maryam	گوجری لوک بار: برسیو، مریاں ڈھینڈی	
	UNIT III: Gojri Folk Tales	**یونٹ 3**: گوجری، نثری لوک ادب	
	• Gojri Folk Tales	لوک کہانیں تے داستان	
	• Proverbs	اکھان تے کہاوت	
	• Idioms/riddles etc.	محاورا، بجھارت تے کبِت	
	UNIT IV: Pahari Folklore-I	**یونٹ 4**:پہاڑی لوک ادب1	
	• **Pahari Folklore- General Introduction**	پہاڑی لوک ادب نا عمومی جائزہتے قسماں	
	• Pahari Folk-Tales	پہاڑی لوک کہانیاں	
	• Pahari Idioms & Proverbs	پہاڑی اکھان تے محاورے	
	UNIT V: Pahari Folklore-II	**یونٹ 5**:پہاڑی لوک ادب2	
	• Pahari Folk-Songs	پہاڑی لوک گیتاں نا عمومی جائزہ	
	• Festive & Seasonal Songs	موسمی تے خوشی غمی نے گیت	
	• Pahari Epics: An Overview	پہاڑی لوک بار: عمومی جائزہ	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**104**		
		گوجری ادبیات: ڈاکٹر رفیق انجمؔ	
		لوک ورثو: ڈاکٹر جاوید راہی	
		مہارو ادب (لوک ادب نمبر) جموں و کشمیر کلچرل اکیڈمی	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		شیرازہ پہاڑی(زبان نمبر) جموں و کشمیر کلچرل اکیڈمی	
		شیرازہ پہاڑی(لوک ادب نمبر) جموں و کشمیر کلچرل اکیڈمی	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		شیرازہ پہاڑی(زبان نمبر) جموں و کشمیر کلچرل اکیڈمی	
		مہارو ادب (ثقافت نمبر) کلچرل اکیڈمی	
		نثر بہار: منشاء خاکی	
		گوجری کہاوت کوش: ڈاکٹر رفیق انجمؔ	

Semester-I

COURSE TITLE: Applied Gojri& Pahari Linguistics
COURSE CODE: MGP-105
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-105 Applied Gojri& Pahari Linguistics عملی گرائمر تے لسانیات		
	UNIT I: Linguistics	**یونٹ 1**: لسانیات کیا ہے	
	• Definition &early development	لسانیات کی تعریف تے ابتدا	
	• Alphabets (Phonemes & Morphemes)	صوتیات تے املا	
	• **Basic Grammar & Syntax**	صرف تے نحو	
	UNIT II: Gojri Linguistics	**یونٹ 2**: گوجری لسانیات	
	• Gojri Alphabets &Orthography	گوجری: رسم الخط، املا تے تلفظ	
	• Special features: Low tones/Retroflexes	گوجری صوتیات کی خاصیت	
	• Gojri Dialects	گوجری لہجا	
	UNIT III: Practical Grammar	**یونٹ 3**: عملی گرائمر	
	• Number & Gender	واحد جمع تے مونث مذکر	
	• Numerals, Names of Days & Months	گنتی، دناں تے مہیناں کا ناں	
	• **Syntax**	جملہ سازی (بناوٹ کا اصول)	
	UNIT IV: Pahari Linguistics-I	**یونٹ 4**: پہاڑی لسانیات	
	• Pahari Alphabets & Orthography	پہاڑی زبان نا لسانی ڈھانچہ	
	• Pahari Language: Special features	پہاڑی زبان نی امتیازی خصوصیات	
	• Pahari Language: Dialects	پہاڑی زبان تے بکھرے بکھرے لہجے	
	UNIT V: Pahari Grammar	**یونٹ 5**:پہاڑی گرائمر	
	• Pahari Phonetics	پہاڑی زبان نی صوتیات	
	• Pahari Orthography	پہاڑی زبان نی صرفیات	
	• Pahari **Syntax**	پہاڑی زبان نی نحویات	

Note for Paper Setting:
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	RECOMMENDED BOOKS :COURSE CODE: MGP-**105**		
		اردو کی لسانی تشکیل: مرزا خلیل احمد بیگ	
		ہندوستانی لسانیات: محی الدین قادری زور	
		اردو املا رشید حسن خان	
		لغات گجری: نجیب اشرف ندوی	
		گوجری ادبیات: ڈاکٹر رفیق انجمّ	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		شیرازہ پہاڑی(زبان نمبر) جموں و کشمیر کلچرل اکیڈمی	
		بنیادی گوجری گرائمر: منشاء خاکی ، ڈاکٹر رفیق انجم	
		گوجری گرائمر: ڈاکٹر جاوید راہی تے انور حسین	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		Linguistic Survey of India vol. IX: GA Grierson	
		Gojri Phonetic Reader: Dr. JC Sharma CIIL Mysore	
		Gojri Grammar: Dr. JC Sharma CIIL Mysore	
		The Gujjarsشیرازہ گوجری(زبان نمبر) کلچرل اکیڈمی	

SEMESTER II

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**UniversityExamination**	**Total**
MGP -201	Modern Gojri& Pahari Literature	4	40	60	100
MGP -202	Classical Gojri& Pahari Poetic Genres	4	40	60	100
MGP -203	Modern Gojri& Pahari Poetic Genres	4	40	60	100
MGP -204	**Modern Gojri& Pahari Prose**	4	40	60	100
Elective Course	Choice Based Open Elective Course from Other Disciplines	4	40	60	100
MGP-205	Introduction to Gojri Language & Literature	4	40	60	100
MGP-206	Introduction to Pahari Language & Literature	4	40	60	100
MGP-207	Introduction to Kashmiri Language & Literature	4	40	60	100
Total		20			500

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Semester-II

COURSE TITLE: Modern Gojri& Pahari Literature **Maximum Marks: 100**
COURSE CODE: MGP-201 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-201COURSE TITLE: Modern Gojri& Pahari Literature		
	UNIT I: Modern Literature**: An overview**	**یونٹ!: جدید ادب**	
	• Literature: Definition & origin	ادب کی تعریف تے ابتدا	
	• Scope & Significance	ادب کی ضرورت تے اہمیت	
	• Types: Poetry & Prose	ادب کی قِسم: شعری ادب، نثری ادب	
	UNIT II: Modern Gojri Poetry:	**یونٹ2: جدید گوجری ادب-1 شاعری**	
	• Origin,Developmen,genres	جدید گوجری شاعری: ابتدا، ارتقا تے قِسم	
	• **Classical genres** Si-HarfiBarah-Maah	گوجری کلاسیکی صنف: سی حرفی، بارہ مانہہ، بیت	
	Modern Genres GojriNazm,Geet, Naat	جدید شعری صنف: نظم، غزل، گیت، نعت وغیرہ	
	UNIT III: Modern Gojri Prose	**یونٹ3:جدید گوجری ادب 2: نثر**	
	• Definition Origin & development	جدید نثری ادب: ابتدا، ارتقا تے قِسم	
	• GojriFiction: Short storie,Drama, Novel:	افسانوی ادب: افساناں ڈراماں، ناول	
	• Non-Fiction: Journalism,Essays, Research	غیر افسانوی ادب: انشائیہ، مضمون، صحافت	
	UNIT IV: Modern Pahari Poetics	**یونٹ4: جدید پہاڑی شاعری**	
	• Origin & development	جدید پہاڑی شاعری: ابتدا، تے ارتقا	
	• Classical Pahari Genres	پہاڑی کلاسیکی صنفاں: سی حرفی، بارہ مانہہ، بیت	
	• Modern Poetic genres	جدید شعری صنفاں: نظم، غزل، گیت، نعت وغیرہ	
	UNIT V: Modern Pahari Prose	**یونٹ5: جدید پہاڑی**	
	• Origin & development	جدید نثری ادب: ابتدا، تے ارتقا	
	• Pahari Fiction	افسانوی ادب: افسانے، ڈرامے، ناول	
	• Non-Fictional Prose	غیر افسانوی ادب: انشائیے، مضمون، صحافت	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**201**		
		رام بابو سکسینه اردو ادب کی تاریخ	
		بوطیقا: ارسطو	
		شعر شور انگیز شمس الرحمٰن فاروقی	
		جدید شاعری عبادت بریلوی	
		اردو فکشن شعبه اردو علیگڑھ	
		کہانی کا ارتقاء: پروفیسر ظہور الدین	
		گوجری ادبیات: ڈاکٹر رفیق انجمؔ	
		گوجری شعریات: ڈاکٹر رفیق انجمؔ	
		گوجری نثریات: ڈاکٹر رفیق انجمؔ	
		پہاڑی زبان و ادب دی تاریخ: نذر بونیاری	
		پرکھ پرچول: نثار راہی	
		شیرازہ پہاڑی(زبان نمبر) کلچرل اکیڈمی	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-II

COURSE TITLE: Classical Gojri& Pahari Poetic Genres **Maximum Marks: 100**
COURSE CODE: MGP-202 **University Examination: 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP -202COURSE TITLE: Classical Gojri& Pahari Poetic Genres		
	UNIT I: Introduction to Classical Genres	**یونٹ!: کلاسیکی صنف**	
	• Origin & Development	تعریف ابتدا ے ارتقا	
	• Major Types	قسم: سی حرفی، بارہ ماہ، بیت وغیرہ	
	• Prominent Writers	نمائیندہ کاسیکی شاعر: سائیں قادر بخش ، سائیں فقر دین,	
	UNIT II: Gojri Si-Harfi	**یونٹ2: گوجری سی حرفی**	
	• Major Themes	نمائیندہ موضوعات	
	• Prominent Writers	نمائیندہ شاعر: ذبیح، حسن دین ، شمس مہجور،	
	• Selected Si-Harfi of Ismaiel Zabih	ذبیح کی چنام سی حرفیں(خصوصی مطالعہ)	
	UNIT III: Gojri Barah-Maah	**یونٹ3: گوجری بارہ مانہہ**	
	• Definition and Themes	نمائیندہ مضمون	
	• Prominent Writers	نمائیندہ شاعر: زار، اسرائیل مہجور ،اسراعیل اثر ،	
	Selected Barah Maah: Zar	خدا بخش زار کا چنام بارہ مانہہ(خصوصی مطالعہ)	
	UNIT IV: Pahari Classical Poetry	**یونٹ4: پہاڑی کلاسیکی شاعری**	
	• Pahari Classical Genres	پہاڑی کلاسیکی شاعری نیاں صنفاں	
	• Major Themes of Classical poetry	پہاڑی کلاسیکی شاعری ے خاص موضوعات	
	• Si-Harfis of Ji Sahib Larvi	جی صاحب نیاں سی حرفیاں (خصوصی مطالعہ)	
	UNIT V: Pahari Classical Genres	**یونٹ5: پہاڑی کلاسیکی صنفاں**	
	• Pahari Si-Harfi	پہاڑی سی حرفیاں	
	• Pahari Barah-Maah	پہاڑی باہ مانہہ	
	• Pahari Bait	پہاڑی چار بیتے	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**202**		
		پہاڑی زبان و ادب دی تاریخ: نذر بونیاری	
		پرکھ پرچول: نثار راہی	
		شیرازہ پہاڑی(زبان نمبر) کلچرل اکیڈمی	
		شیرازہ پہاڑی (گوشہ زمان چن)	
		گوجری شعریات: ڈاکٹر رفیق انجمّ	
		جی صاحب نیاں سی حرفیاں	
		نیر سمندر: تالیف میاں بشیر احمد لاروی	
		کلیات ذبیحؔ	
		کلیات خدا بخش زار	
		کلیات اثر جموں و کشمیر کلچرل اکیڈمی	
		کلیات خدا بخش زار جموں و کشمیر کلچرل اکیڈمی	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-II

COURSE TITLE: Modern Gojri& Pahari Poetic Genres
COURSE CODE: MGP-203**
Credits: 4
Duration of Examination: 2 Hours

Maximum Marks: 100
University Examination: 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-203 COURSE TITLE:** Modern Gojri& Pahari Poetic Genres		
	UNIT I: Introduction to Modern Poetry	**یونٹ!: جدید شعری صنف**	
	• Origin, types& Development	مختلف قسم تے ابتدا	
	• Format and Principles	ہیئیت تے روایت	
	• Recent developments	موجودہ صورتحال (تجربات)	
	UNIT II: Modern Gojri Poetry-I	**یونٹ2: جدید گوجری شاعری 1:**	
	• Divine Praises & Eulogies of Prophet	حمد تے نعت: ابتدا، ارتقاء تے نمونا	
	• Gojri Ghazal: Origin & development	غزل: ابتدا، ارتقاء تے نمونا	
	• Gojri Geet: Origin & development	گیت: ابتدا، ارتقاء تے نمونا	
	UNIT III: Modern Gojri Poetry-II (Nazm)	**یونٹ3: جدید گوجری شاعری :2**	
	• Gojri Poems: Origin & development	نظم: ابتدا، ارتقاء تے نمونا	
	• Eulogies & Tributes:	قصیدہ تے مرثیہ کی روایت	
	• Gojri Satirical Poetry	مزاحیہ شاعری: نذیر، نور، تاج، نذیر بھٹی	
	UNIT IV: Modern Pahari Poetry-I	**یونٹ4: جدید پہاڑی شاعری-1**	
	• **Modern Pahari Poetry: Historical background**	جدید پہاڑی شاعری: تاریخی پہلو	
	• Modern Pahari Poetry: Poetic Genres	جدید پہاڑی شاعری نیاں صنفاں	
	• Modern Pahari Poetry: Recent advances	جدید پہاڑی شاعری وچ نویں تجربے	
	UNIT V: Modern Pahari Poetry-II	**یونٹ5: جدید پہاڑی شاعری-2**	
	• Pahari Ghazal: Diction	پہاڑی غزل نا اسلوبیاتی مطالعہ	
	• Pahari Ghazal: Thematic Analysis	**پہاڑی نظم : موضوعاتی مطالعہ**	
	• Pahari Eulogy & Songs	پہاڑی نعت تے گیت	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**203**		
		شعر شور انگیز شمس الرحمٰن فاروقی	
		جدید شاعری عبادت بریلوی	
		پہاڑی زبان و ادب دی تاریخ: نذر بونیاری	
		پرکھ پرچول: نثار راہی	
		شیرازہ پہاڑی(زبان نمبر) کلچرل اکیڈمی	
		گوجری شعریات: ڈاکٹر رفیق انجمؔ	
		شیرازہ گوجری نعت نمبر کلچرل اکیڈمی	
		سوچ سمندر: ڈاکٹر رفیق انجم	
		غزل سلونی: ڈاکٹر رفیق انجم	
		شیرازہ پہاڑی غزل نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ پہاڑی نعت نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ گوجری غزل نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-II

COURSE TITLE: Modern Gojri& Pahari Prose **Maximum Marks: 100**
COURSE CODE: MGP-204 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 2 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-204 COURSE TITLE:** Modern Gojri& Pahari Prose		
	UNIT I: Introduction to Modern Prose	**یونٹ!: جدید نثری صنف**	
	• Definition & description	نثری ادب کی تعریف تے حدود	
	• Origin & Development	نثری ادب : شروعات تے ارتقاء	
	• Current Scenario	نثری ادب: موجودہ صرتحال	
	UNIT II: GojriFiction	**یونٹ2: گوجری افسانوی ادب**	
	• Gojri Short Stories	گوجری افساناں: فن تے روایت	
	• Gojri Drama & Novel	گوجری ڈراما تے ناول: ابتدا تے ارتقاء	
	• Gojri Fiction: An estimate	گوجری افسانوی ادب: تجزیاتی مطالعو	
	UNIT III: GojriProse -II(Non-Fiction)	**یونٹ3: گوجریغیر افسانوی ادب**	
	• Gojri Journalism& Essay Writing	گوجری صحافت تے مضمون نگاری	
	• Gojri Research & Criticism	گوجری تحقیق تے تنقید	
	• Gojri Translations	گوجری ترجمہ نگاری	
	UNIT IV: Pahari **Fiction -I**	**یونٹ4: پہاڑی افسانوی ادب**	
	• Pahari Short Stories	پہاڑی افسانے: فن تہ روایت	
	• Pahari Drama & Novel	پہاڑی ڈرامے تہ ناول: ابتدا تہ ارتقاء	
	• Pahari Fiction: An Analysis	پہاڑی افسانوی ادب: تجزیاتی مطالعو	
	UNIT V: Pahari **Prose– II(Non-Fiction)**	**یونٹ5: پہاڑی غیر افسانوی ادب 2**	
	• Pahari Journalism & Essay Writing	پہاڑی صحافت تے مضمون نگاری	
	• Pahari Research & Criticism	پہاڑی تحقیق تے تنقید	
	• Pahari Translations	پہاڑی ترجمہ نگاری	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**204**		
		اردو فکشن :شعبہ اردو علیگڑھ	
		کہانی کا ارتقاء: پروفیسر ظہور الدین	
		شیرازہ پہاڑی زبان نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ گوجری افسانہ نمبر جموں کشمیر کلچرل اکیڈمی	
		گوجری ادب کی سنہری تاریخ: ڈاکٹر رفیق انجمؔ	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		پرچول: عبدالمجید حسرت	
		گوجری نثریات: ڈاکٹر رفیق انجمؔ	
		پرکھ پرچول: نثار راہیؔ	
		شیرازہ پہاڑی افسانہ نمبر جموں کشمیر کلچرل اکیڈمی	

Semester-II

Choice Based Open Elective Courses for Other Disciplines:

COURSE TITLE: Introduction to Gojri Language & Literature **Maximum Marks: 100**
COURSE CODE: MGP-205/ECG-247 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-205	**COURSE TITLE: گوجری زبان تے ادب: اک تعارف**	
	UNIT I: History of Gujjars: An overview	**یونٹ!: گوجر قوم کی تاریخ**	
	• Origin, migration & early settlement	گجراں کو اصلی وطن تے ہجرت	
	• Golden Period & Decline	گجراں کو سنہری دور تے زوال	
	• Present Status	موجودہ صورتحال	
	UNIT II: History of Gojri Language	**یونٹ2:** گوجری ادب کی تاریخ: 1700 عیسوی تک	
	• Introduction & Linguistic group	تعارف تے لسانی خاندان	
	• Early development	قدیم گوجری: ابتدا تے ارتقاء	
	• Ancient Gojri Poets	قدیم شاعر: امیر خسرو، میرا بائی، کبیر، امین گجراتی	
	UNIT III: Gojri Folklore: 1700-1900 CE	**یونٹ3: گوجری لوک ادب :** 1700 تیں 1900 تک	
	• Historical background	تاریخی پس منظر	
	• Folk tales	لوک کہانیں تے داستان	
	Folk songs & Epics	لوک گیت تے لوک بار	
	UNIT IV: Modern Gojri Literature-I	**یونٹ4: جدید گوجری ادب 1** بیہویں صدی ما	
	• Provinces & Dialects	گوجری کا علاقا تے بولیں	
	• Basic Gojri Grammar	بنیادی گوجری گرائمر	
	• Revival of Gojri in 20th Century	جدید ادب کی شروعات	
	UNIT V: Modern Gojri Literature-II	**یونٹ5: جدید گوجری ادب 2:**بیہویں صدی ما	
	• Modern Gojri Poetry	جدید گوجری شاعری: تعریف، قسم تے ارتقاء	
	• Modern Gojri Prose	جدید گوجری نثر: تعریف، قسم تے ارتقاء	
	• Research & Criticism	تحقیق تے تنقید	

Note for Paper Setting:
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	RECOMMENDED BOOKS :COURSE CODE: MGP-**205**		
		The Glory that was GurjarDesha: KM Munshi	
		تاریخ ضاء البیان: عبد الغنی شاشی	
		Linguistic Survey of India: GA Grierson	
		اردو ادب کی تاریخ: رام بابو سکسینه	
		گوجر، گوجری زبان و ادب: رام پرشاد کھٹانه	
		گوجری ادبیات: ڈاکٹر رفیق انجمؔ	
		گوجری شعریات: ڈاکٹر رفیق انجمؔ	
		گوجری نثریات: ڈاکٹر رفیق انجمؔ	
		لوک ورثو: ڈاکٹر جاوید راہی	
		نثر بہار: منشاء خاکی	
		گوجری گرائمر: منژاء خاکی/ ڈاکٹر رفیق انجم	
		گوجری گرائمر: انور حسین/ ڈاکٹر جاوید راہی	
		گوجری کہاوت کوش: ڈاکٹر رفیق انجم	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		گوجری اور اُردو: ایک تقابلی مطالعہ: ڈاکٹر مرزا خان وقار	

Semester-II

Choice Based Open Elective Courses for Other Disciplines:

COURSE TITLE: Introduction to Pahari Language & Literature **Maximum Marks: 100**
COURSE CODE: MGP-206/ECP-248 **University Exam.: 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-206 COURSE TITLE: Introduction to Pahari Language & Literature		
	UNIT I: Pahari Language & People	**یونٹ!: پہاڑی زبان تہ لوک**	
	• Pahari Culture & Traditions: An Overview	پہاڑی ثقافت: اک تعارف	
	• Pahari Language: Origin & Development	پہاڑی زبان: آغاز تہ ارتقاء	
	Pahari's interaction with other languages	پہاڑی تہ دُوئی علاقائی زباناں نا آپسی رشتہ	
	UNIT II: Pahari Culture& Traditions	**یونٹ2: پہاڑی تہذیب**	
	• Habitat& Cultural life	پہاڑی رہن سہن نا مطالعہ	
	• Pahari Idioms & Proverbs	پہاڑی اکھان تہ بجھارتاں	
	• Pahari Folklore	پہاڑی لوک ادب	
	UNIT III: History of Pahari Language	**یونٹ3: پہاڑی ادب نی تاریخ**	
	• Pahari Poetics	پہاڑی شعری ادب: آغاز تہ ارتقائ	
	• Pahari Prose	پہاڑی نثری ادب: آغاز تہ ارتقاء	
	• Pahari Research & Analysis	پہاڑی تحقیق تہ تنقید	
	UNIT IV: Pahari Poetics	**یونٹ4: پہاڑی شعری ادب**	
	• Pahari Poetry in Pir-Panchal	پیر پیچال وچہ پہاڑی شاعری	
	Selected Pahari Poems:	چنام پہاڑی نظماں	
	Selected Pahari Ghazals:	چنام پہاڑی غزلاں	
	UNIT V: Pahari Prose:	**یونٹ5: پہاڑی نثری ادب**	
	• Pahari Prose in Pir-Panchal	پیر پیچال وچہ پہاڑی نثری ادب	
	• Pahari Short Stories: An overview	پہاڑی افسانہ نگاری نا جائزہ	
	• Selected Pahari Short Stories:	چنام پہاڑی افسانے	

Note for Paper Setting:
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	RECOMMENDED BOOKS :COURSE CODE: MGP-**206/ECP-248**		
		پہاڑی زبان و ادب دی تاریخ: نذر بونیاری	
		پرکھ پرچول: نثار راہی	
		شیرازہ پہاڑی(زبان نمبر) کلچرل اکیڈمی	
		پہاڑی قبیلے: کے ڈی مینی	
		نِمل: راجہ نذر بونیاری	
		شیرازہ پہاڑی-پہاڑی نظم نمبرکلچرل اکیڈمی سرینگر	
		پیر پنجال نے پہاڑی قلمکار: لیاقت نیر	
		شیرازہ پہاڑی غزل نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ پہاڑی نعت نمبر جموں کشمیر کلچرل اکیڈمی	
		شیرازہ پہاڑی-پہاڑی گیت نمبر کلچرل اکیڈمی سرینگر	
		شیرازہ پہاڑی افسانہ نمبر جموں کشمیر کلچرل اکیڈمی	

Semester-II

Choice Based Open Elective Courses for Other Disciplines:

COURSE TITLE: Introduction to Kashmiri Language & Literature **Maximum Marks: 100**
COURSE CODE: MGP-207/ECK-249 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE:MGP-207COURSE TITLE: Introduction to Kashmiri Language & Literature		
	UNIT I:Kashmiri Language	**یونٹ!:** زبان : اہمیت تہ افادیت	
	• History of Kashmir: An Overview	کشیر ہند تواریخ	
	• Kashmiri Culture	کاشر کلچر: اکھ تعارف	
	• Kashmiri Language: origin & early dev.	کاشر زبان: آگر تہ نسبتی رشتہ	
	UNIT II: Kashmiri Grammar	**یونٹ2:**کاشر کی گرامر	
	• Grammar & Phonetics	کاشر کی گرامر تہ صوتیات	
	• Idioms & Proverbs	محاور، دپتی تہ کہاو ژ	
	• Sufi Tradition in Sufi Poetry	کاشر شاعری ہنز صوفی روایت	
	UNIT III: Kashmiri Literature	**یونٹ3:** کاشر ادب	
	• Kashmiri Poems	کاشر نظم: اکھ مختصر تعارف	
	• Kashmiri Ghazal	کاشر غزل: اکھ مختصر تعارف	
	Kashmiri Short Stories	کاشر افسانہ: اکھ مختصر تعارف	
	UNIT IV: Kashmiri Translations	**یونٹ4:** کاشر ترجمہ کاری	
	• The Art of Translations	ترجمہ کاری ہند فن: اکھ تعارف	
	• Kashmiri Translation of passages	اقتباس ہند کاشر ترجمہ	
	• Kashmiri Translation of Urdu Sentences	انگریزی/ اردو محاورن/ جملن ہند کاشر ترجمہ	
	UNIT V: Kashmiri Language in Jammu Province	**یونٹ5:**جیمی صوبس منز کاشر زبان	
	• Status of Kashmiri Language in Jammu	جیمی صوبس منز کاشر زبان	
	• Regional dialects of Kashmiri	کاشر زبانی ہنز علاقایی بولہ	
	• Status of Kashmiri Ghazal in Jammu	جیمی صوبک کاشر غزل: اکھ تعارف	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS:امدادی کتابہ	COURSE CODE: MGP-**207**	
		نو وکاشرِ ادبُک تواریخ: شفیع شوق	
		کاشریک گرامر: شفیع شوق	
		کاشر ی دپتی: غلام نبی ناظر	
		انہار(ترجمک فن): شعبہ کاشر،کشمیریونیورسٹی، کشمیر	
		جیمی صوبس منز کاشر زبان و ادبک تواریخ: منشور بانہالی	

SEMESTER III

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**UniversityExamination**	**Total**
MGP -301	Jadid Gojri & Pahari Ghazal	4	40	60	100
MGP -302	Jadid Gojri & Pahari Nazm	4	40	60	100
MGP -303	Jadid Gojri & Pahari Afsana	4	40	60	100
MGP -304	Gojri & Pahari Drama & Novel	4	40	60	100
CBCS Electives	Any one of following Electives		40	60	100
MGP -305/	Special Study of Iqbal Azeem	4	40	60	100
MGP -306/	Special Study of Sabir Mirza	4	40	60	100
Total		20			500

Semester-III

COURSE TITLE: Jadid Gojri & Pahari Ghazal
COURSE CODE: MGP-301
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam.: 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-301	**COURSE TITLE:** Jadid Gojri& Pahari Ghazal	
	UNIT I: Introduction to Ghazal: **An overview**	**یونٹ!: غزل بحیثت ادبی صنف**	
	• Definition, Origin & Development	تعارف، ابتدا	
	• Poetic format	ہیئیت تے روایت	
	• Present Status	موجودہ صورتحال	
	UNIT II: Gojri Ghazal through the years	**یونٹ2: گوجری غزل کو سفر**	
	• Origin & Development	تعریف تے شروعات	
	• Special features & Themes	شناخت تے موضوعات	
	• Tradition & Novelty	روایت تے جِدت (تجزیہ)	
	UNIT III: Prominent Poets	**یونٹ3:**گوجری غزل:نمائیندہ شاعر(متنی تدریس)	
	• Israiel Asr & Sarwari Kassana	اسرائیل اثر: گراچھاں کی رُت، تیرا غم ما آکے میں سروری کسانہ: رات کلکھنی بال، لمڑاہ راہ	
	• Iqbal Azeem & Rafique Anjum	اقبال عظیم: لُکھیں لکھیں رات، جھُوٹھا قول قرار رفیق انجمّ: آنو باز نہ آیا ، کیسے رنگ کی لوڑ نہ	
	• Masha Khaki & Javed Rahi	منشاء خاکی:رُنو وقت اخیر نا رُنو، بھُل بھلاوے کوئے جاوید راہی: وہ بدل جے برھیو، کیسی آفت آن پئی	
	UNIT IV: Modern Gojri Prose-I	**یونٹ4: پہاڑی غزل**	
	• Origin & Development	تعریف تے شروعات	
	• Special features & Themes	شناخت تے موضوعات	
	• Tradition & Novelty	روایت تے جِدت (تجزیہ)	
	UNIT V: Modern Gojri Prose-II	**یونٹ5: پہاڑی غزل: نمائیندہ شاعر**(متنی تدریس)	
	• KD Maini & Sheikh Azad	کے ڈی مینی : یاد تیری نا پہامڑ، دور پہاڑاں بِچل شیخ آزاد: اک خلیتی، وراثت چھوڑ جاساں	
	• Farooq Anwar & Imtiaz Naseem	فاروق انوار : پمنیاں تر اتھرواں نے، بدل چھٹسن امتیاز نسیم:دل سمہالی کہہ کرسو،چہکھڑ چھُلنے	
	• Layaqat Nayyar & Parvez Malik	لیاقت نیر:سجنا موڑ مہاراں، ٹالیں پتر کیرا لگنا پرویز ملک: ظالم ساری رات، پھُلاں نے بُور ٹیہہ گئے	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**301**		
		شعر شور انگیز شمس الرحمٰن فاروقی	
		مقدمه شعرو شاعری: الطاف حسین حالی	
		غزل اور مطالعه غزل: عبادت بریلوی	
		اردو غزل کے اہم موڑ: شمس الرحمٰن فاروقی	
		سوچ سمندر: ڈاکٹر رفیق انجمؔ	
		گوجری ادب کی سنہری تاریخ جلد 5 گوجری غزل کلچرل اکیڈمی سرینگر	
		خطہ پیر پنچال نے پہاڑی قلمکار: داکٹر لیاقت نیر	
		شیرازہ گوجری غزل نمبر کلچرل اکیڈمی سرینگر	
		شیرازہ پہاڑی غزل نمبر کلچرل اکیڈمی سرینگر	
		غزل سلونی: ڈاکٹر رفیق انجمؔ	
		گوجری شعریات: ڈاکٹر رفیق انجّم	
		شیرازہ گوجری(گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-III

COURSE TITLE: Jadid Gojri & Pahari Nazm
COURSE CODE: MGP-302
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-302 **COURSE TITLE:** Jadid Gojri& Pahari Nazm	
	UNIT I: Nazm: **An overview**	**یونٹ!: نظم اک تعارف**
	• Definition, Origin & Development	تعریف، ابتدا تے ارتقاء
	• Poetic Tradition & Types	روایت تے قِسم :حمد نعت، نظم، گیت
	• Recent trends	جدید رُجحانات
	UNIT II: Gojri Poems: An Overview	**یونٹ2: گوجری نظم** عمومی جائزہ
	• Definition, Origin & Development	ابتدا تے ارتقاء
	• Poetic Tradition & Types	روایت تے قِسم: حمد نعت، نظم، گیت
	• Critical Analysis	خوبی تے خامی
	UNIT III: Selected Gojri Poems*	**یونٹ3: معروف نظم گو شاعر***
	نعت: سروری کسانہ: نبیاں کا سردار نبی ، شمس دین مہجور: خدایا مدینہ کو دربار دسئیے؛ شاہباز راجوروی: اللہ اللہ مدینہ نظر آگیو،	
	نظم: نسیم پُونچھی:چھنڈی، نذیر احمد نذیر: کہڑے طور زمانہ کو دور چلے، نور محمد نور: دوبیاہ	
	گیت: سروری کسانہ، سنگی میرو مدتاں کو ربا تیں وچھوڑیو؛، اسرائیل اثر:اُڈ رے کبوترا توں چن میرو لوڑئیے اقبال عظیم: خیراں نال رب آنے	
	UNIT IV: Modern PahariNazm	**یونٹ4: پہاڑی نظم** عمومی جائزہ
	• Definition, Origin & Development	ابتدا تے ارتقاء
	• Poetic Tradition & Types	روایت تے قِسم: حمد نعت، نظم، گیت
	• Critical Analysis	تجزیاتی مطالعہ
	UNIT V: Selected Pahari Nazm**	**یونٹ5:چنام پہاڑی نظماں****
	نعت: شیخ آزاد: تُس اللہ نے دیدار نبی، رشید قمر: پراں کی تولنا رہنا، امتیاز نسیم: مدینے نا سفر ہوسی	
	نظم: عظیم خان: وادی لولاب نوراللہ قریشی: توبہ، سوامی انتر نکھیڑا	
	گیت: رشید قمر: بس اکوار چلیاں فر پے گئے عمر وچھوڑے، مجروح ملنگامی: پہلاں حمد خداوند اگے، شیخ ظہور، اوہ جنہاں کجھ قرار کیتے سن	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**30**2		
		بوطیقا عزیز احمد	
		شعر شور انگیز شمس الرحمٰن فاروقی	
		مقدمه شعرو شاعری: الطاف حسین حالی	
		جدید نظم کی کروٹیں: وزیر آغا	
		گوجری شعریات: ڈاکٹر رفیق انجمّ	
		پہاڑی زبان و ادب دی تاریخ:راجه نذر بونیاری	
		تاریخ ادبیات پونچھ ایوب شبنم	
		ادبیات پیر پنجال : جاوید انور	
		شیرازہ پہاڑی (گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		شیرازہ گوجری (گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-III

COURSE TITLE: Jadid Gojri& Pahari Afsana
COURSE CODE: MGP-303
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-303	**COURSE TITLE:** Jadid Gojri& Pahari Afsana	
	UNIT I: Short Stories: **An overview**	**یونٹ!: افسانہ نگاری**	
	• Definition &Origin	تعریف، ابتدا تے اجزا	
	• Tradition & Development	روایت تے سفر	
	• New Dimensions of Short Stories	نئے تجربات	
	UNIT II: GojriShort Stories: An Overview	**یونٹ2: گوجری افسانہ**	
	• Origin & Development	ابتدا تے ارتقاء	
	• Major Themes	نمائیندہ موضوعات	
	• Critical Analysis	خوبی تے خامی	
	UNIT III: Selected Gojri Short Stories	**یونٹ3: گوجری کا چنام افسانہ نگار**	
	• Ameen Qamar:	محمد امین قمر: آٹا کو پاء، بیاہ	
	• Dr. MK Waqar	ڈاکٹر مرزا خان وقار: آدمی، راجکماری	
	• Dr. ND Baru	ڈاکٹر نصرالدین بارُو: لہو، سوچ	
	UNIT IV: Pahari Short Stories: An Overview	**یونٹ4: پہاڑی افسانے**	
	• Origin & Development	پہاڑی افسانے نا تاریخی سفر	
	• Foreign Influence on Pahari Afsana	پہاڑی افسانے اُپر دیگر زباناں تے اثرات	
	• Critical Analysis	پہاڑی افسانے نا تنقیدی جائزہ	
	UNIT V: Selected Pahari Short Stories	**یونٹ5:نمائیندہ پہاڑی افسانہ نگار**	
	• Nisar Rahi	نثار راہی:سانجھا لہو، جس نا زور اس نی راجور	
	• Jahangir Danish	جہانگیر دانش:حضرت جی، ترے کُتے	
	• Parvez Manus	پرویز مانوس: آہلنے، پیڑ پرائی	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-303		
		اردو فکشن :شعبہ اردو علیگڑھ	
		کہانی کا ارتقاء: پروفیسر ظہور الدین	
		گوجری نثریات: ڈاکٹر رفیق انجمؔ	
		شیرازہ گوجری افسانہ نمبر	
		شیرازہ پہاڑی افسانہ نمبر	
		تہند: نثار راہی	
		کالا حرف: ایم کے وقار	
		چانئی: امین قمر	
		آپنی چھاں: ڈاکٹر نصرالدین باڑو	
		گوجری ادب کی سنہری تاریخ جلد 7 گوجری افسانہ	
		پہاڑی افسانوی ادب: جہانگیر دانش	
		پہاڑی افسانہ: جہانگیر دانش	
		شیرازہ پہاڑی (گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		شیرازہ گوجری (گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		پونچھ نا سرمد: علی عدالت	
		چہریٹھاں : پرویز مانوس	
		مِٹھی نِچھ: راجہ نذر بونیاری	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	

Semester-III

COURSE TITLE: Jadid Gojri& Pahari Drama
COURSE CODE: MGP-304
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-304 **COURSE TITLE:** Jadid Gojri& Pahari Drama	ڈرامہ اور ناول	
	UNIT I: Drama & Novel: **An overview**	**یونٹ!: ڈرامہ اور ناول**	
	• Drama: Definition &Origin	ڈرمہ تعریف تے ابدا	
	• Drama: Types & Tradition	ڈرامہ کی روایت تے اقسام	
	• Noval: Origin & Development	ناول نگاری	
	UNIT II: GojriDrama/Plays: An Overview	**یونٹ2: گوجری ڈرامہ تے ناول**	
	• Origin & Development	ابتدا تے ارتقاء	
	• Major Themes & Development	ڈرامہ کو سفر تے موضوع	
	• Critical Analysis	خوبی تے خامی	
	UNIT III: Prominent GojriPlaywrights	**یونٹ3: نمائندہ گوجری ڈرامہ تے ناول نگار**	
	• Qaisar ud-Din Qaisar	قیصر الدین قیصر: باڈر کا بسنیک(ڈرامہ)	
	• Gulab ud-Din Tahir	گلاب الدین طاہر: اندھرا ما لوء(ڈرامہ)	
	• Ghulam Rasul Asghar	غلام رسول اصغر: آخری سہارو(ناول)	
	UNIT IV: Modern Pahari Drama & Novel	**یونٹ4: پہاڑی ڈرامے تے ناول: اک تعارف**	
	• Origin & Development of Drama	پہاڑی ڈرامے نی تعریف، تاریخ تے ارتقاء	
	• Origin & Development of Novel	پہاڑی ناول نی تعریف، تاریخ تے ارتقاء	
	• Critical Analysis of Pahari Drama & Novel	پہاڑی ڈرامے تے ناول نا تنقیدی جائزہ	
	UNIT V: Pahari Novel & Playwrights	**یونٹ5: پہاڑی ڈرامہ تے ناول نگار**	
	• Abdul Rashid Lone	عبدالرشید لون: کریما(ڈرامہ)	
	• Rasheed Qamar	رشید قمر: حویلیاں نی اگ(ڈرامہ)	
	• Zeenat Firdous	زینت فردوس: چٹی چادر پیار نی(ناول)	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**30**4		
		اردو ڈرامے کا ارتقاء عشرت رحمانی	
		پہاڑی زبان و ادب دی تاریخ: نذر بونیاری	
		گوجری نثریات: ڈاکٹر رفیق انجمّ	
		گوجری ادب کی سنہری تاریخ جلد 8 گوجری ڈراما	
		شیرازہ پہاڑی ڈراما نمبر کلچرل اکیڈمی سرینگر	
		چٹی چادر پیار نی (ناول) زینت فردوس زینت	
		آخری سہارو: غلام رسول اصغرّ	
		شیرازہ پہاڑی (ناول نمبر) کلچرل اکیڈمی سرینگر	
		شیرازہ پہاڑی (گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		شیرازہ گوجری (گولڈن جوبلی نمبر) کلچرل اکیڈمی	
		عبدالرشید لون: کہانی کہر کہر دی	

Semester-III

COURSE TITLE: Special Study of Iqbal Azeem
COURSE CODE: MGP-305
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-305 COURSE TITLE: Special Study of Iqbal Azeem اقبال عظیم		
	UNIT I: Biography: **An overview**	**یونٹ!: حالات زندگی**	
	• Family background	خاندانی پس منظر	
	• Early education& Training	تعلیم تے تربیت	
	• Dimensions of GojriWritings	علمی تے ادبی جہات	
	UNIT II: Dimensions of Gojri Writings	**یونٹ2:بحیثیت ادیب**	
	• Journey through Literature	اقبال عظیم کو ادبی سفر	
	• Literary Stature	اقبال عظیم گو ادبی مقام	
	• Patron of Young writers	اقبال عظیم تے نواں قلمکار	
	UNIT III: Iqbal Azeem as POET	**یونٹ3:بحیثیت شاعر**	
	• Hamd & Eulogy، Poems & Lyrics	حمد تے نعت، نظم تے گیت	
	• Gojri Ghazal of Iqbal Azeem	اقبال عظیم کی غزل گوئی	
	• Punjabi/Urdu Poetry of Iqbal Azeem	اقبال عظیم کی پنجابی/ اُردو شاعری	
	UNIT IV: Iqbal Azeem as Prose Writer	**یونٹ4: بحیثیت نثر نگار**	
	• Gojri Fiction	اقبال عظیم کی گوجری فکشن نگاری	
	• GojriResearch	گوجری تحقیق تے اقبال عظیم	
	• Literary Criticism	گوجری تنقید تے اقبال عظیم	
	UNIT V: Iqbal Azeem as Journalist	**یونٹ5: بحیثیت صحافی**	
	• Iqbal Azeem as Editor of Gujjar Des	گوجر دیس کی صحافت	
	• Iqbal Azeem as As Broadcaster	اقبال عظیم کی ریڈیائی خدمات	
	• Iqbal Azeem & Cultural Academy	کلچرل اکیڈمی تے اقبال عظیم	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE: MGP-**30**5		
		گوجری ادب کی سنہری تاریخ: ڈاکٹر رفیق انجمؔ	
		گوجری ادبیات: ڈاکٹر رفیق انجمؔ	
		کلیات اقبال عظیم: جموں و کشمیر کلچرل اکیڈمی	
		لعلاں کا بنجارا : ڈاکٹر رفیق انجمؔ	
		ریجھ کولیں: اقبال عظیم	
		پیاب: اقبال عظیم	
		گلی نی فقیر دی وچوں: اقبال عظیم	
		روداد قوم: اقبال عظیم نمبر	
		شیرازہ گوجری (گولڈن جوبلی نمبر) کلچرل اکیڈمی	

Semester-III

COURSE TITLE: Special Study of Sabir Mirza
COURSE CODE: MGP-306
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam.: 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-306COURSE TITLE: Special Study of Sabir Mirza		
	UNIT I: Biography	**یونٹ!: حالات زندگی**	
	• Family Background	خاندانی پس منظر	
	• Education	تعلیم تے تربیت	
	• Sabir Mirza a Social figure	صابر مرزا ہک سماجیشخصیت	
	UNIT II: Dimensions of Pahari Writings	**یونٹ2:صابر مرزا :ادبی جہات**	
	• Journey through Literature	نا ادبی سفرصابر مرزا	
	• Literary Stature	نی ادبی اہمیتصابر مرزا	
	• Dimensions of Pahari Writings	علمی تے ادبی جہات	
	UNIT III: Sabir Mirza as POET	**یونٹ3:صابر مرزا بحیثیت شاعر**	
	• Hamd & Eulogy, Poems & Lyrics	حمد تے نعت، نظم تے گیت	
	• Pahari Ghazals of Sabir Mirza	صابر مرزا نی غزل گوئی	
	• Gojri Poetry of Sabir Mirza	صابر مرزا نی گوجری شاعری	
	UNIT IV: Sabir Mirza as Prose Writer	**یونٹ4: صابر مرزا بحیثیت نثر نگار**	
	• Pahari Fiction	پہاڑی فکشن تہ صابر مرزا	
	• Pahari/Gojri Research	پہاڑی،گوجری تحقیق تہ **صابر مرزا**	
	• Literary Criticism	پہاڑی تنقید تہ **صابر مرزا**	
	UNIT V: Sabir Mirza in other Roles	**یونٹ5: دیگر جہات**	
	• Sabir Mirza in School Education	**صابر مرزا نی تعلیمی خدمات**	
	• Sabir Mirza as Translator	**صابر مرزا بحیثیت ترجمہ نگار**	
	• Sabir Mirza in Cultural Academy	کلچرل اکیڈمی تے **صابر مرزا**	

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

	RECOMMENDED BOOKS :COURSE CODE : MGP-306		
	پہاڑی زبان و ادب دی تاریخ: نذر بونیاری		
	پرکھ پرچول: نثار راہی		
	شیرازہ پہاڑی(زبان نمبر) کلچرل اکیڈمی		
	پیر پنجال ۓ پہاڑی قلمکار: لیاقت نیر		
	نِمل: راجہ نذر بونیاری		
	ادب ۓ ادیب (تحقیقی مضامین)	ڈاکٹر عبدالحق نعیمیؔ	
	استا ادب (صابر مرزا نمبر) جموں کشمیر کلچرل اکیڈمی		
	شیرازہ پہاڑی-پہاڑی نظم نمبرکلچرل اکیڈمی سرینگر		
	شیرازہ پہاڑی غزل نمبر جموں کشمیر کلچرل اکیڈمی		
	شیرازہ پہاڑی نعت نمبر جموں کشمیر کلچرل اکیڈمی		
	شیرازہ پہاڑی-پہاڑی گیت نمبر کلچرل اکیڈمی سرینگر		
	شیرازہ پہاڑی (گولڈن جوبلی نمبر) کلچرل اکیڈمی		
	صوبہ جموں کی علاقائی زبانوں پر اردو کے اثرات:	ڈاکٹر صابر مرزا	
	مثنوی مولانا روم(پہاڑی ترجمہ)	ڈاکٹر صابر مرزا	
	رنگ رُتاں گلزار (شعری مجموعہ)	ڈاکٹر صابر مرزا	
	خوشبو نما(شعری مجموعہ اردو)	ڈاکٹر صابر مرزا	
	کُوک کلیجا کیں (شعری مجموعہ گوجری)	ڈاکٹر صابر مرزا	
	باغ بہاراں (شعری مجموعہ پہاڑی)	ڈاکٹر صابر مرزا	

SEMESTER IV

Course Code	Course Title	Credits	Distribution of Marks		
Courses:			**Sessional Assessment**	**UniversityExamination**	**Total**
MGP -401	Gojri& Pahari AdabiTehqeeq (Research)	4	40	60	100
MGP -402	Gojri& Pahari AdabiTanqeed (Criticism)	4	40	60	100
MGP -403	Non-Fictional Prose &Sahafat	4	40	60	100
MGP -404	GojriTarjuma Nigari	4	40	60	100
MGP -405	Dissertation/ Project Report	4	60	40	100
Total		20			500

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Semester-IV

COURSE TITLE: Jadid Gojri& Pahari **Tehqeeq** **Maximum Marks: 100**
COURSE CODE: MGP-401 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-401 **COURSE TITLE:** Jadid Gojri& Pahari Research تحقیق		
	UNIT I: Introduction to Research	**یونٹ!: تحقیق : اک تعارف**	
	• Origin & Development	تعریف تے ابتدا	
	• Types & Traditions	روایت تے اقسام	
	• Modern Trends	موجودہ صورتحال	
	UNIT II: Research in Gojri: An Overview	**یونٹ2: گوجری تحقیق 1**	
	• Origin & Development	شروعات تے سفر	
	• Research Papers & Theses	تحقیقی مضمون تے مقالا	
	• Research in Gojri Linguistics	لسانیاتی تحقیق(گرائمر تے ڈکشنری)	
	UNIT III: Eminent Gojri Researchers	**یونٹ3: گوجری تحقیق تے تدوین2**	
	• Dr. RP Khatana: GojriZaban-o-Adab	گوجری زبان و ادب: ڈاکٹر رام پرشاد کھٹانہ	
	• Dr. Rafique Anjum: Golden History	گوجری ادب کی سنہری تاریخ: ڈاکٹر رفیق انجم	
	• Dr. Javed Rahi: Gojri Folklore	گوجری لوک ورثو: ڈاکٹر جاوید راہی	
	UNIT IV: Research in Pahari: An Overview	**یونٹ4: پہاڑی تحقیق 1**	
	• Origin & Development	پہاڑی تحقیق نی شروعات تہ ارتقاء	
	• Research Papers & Theses	پہاڑی تحقیقی مضامین تے مقالے	
	• Research in Gojri Linguistics	لسانیاتی تحقیق	
	UNIT V: Eminent Pahari Researchers	**یونٹ5: پہاڑی تحقیق تہ تدوین**	
	• Sharda: Raja Nazar Bonyari	شاردا(تاریخ) راجہ نذر بونیاری	
	• History of Pahari Language	پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
	• Shiraza Pahari (Zaban number)	شیرازہ پہاڑی (زبان نمبر) کلچرل اکیڈمی	

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	RECOMMENDED BOOKS :COURSE CODE: MGP-**401**		
		مقدمه شعرو شاعری الطاف حسین حالی	
		ادبی تحقیق مسائل اور تجزیه رشید حسن خان	
		مبادیات تحقیق عبدالرزاق قریشی	
		شاردا(تاریخ) راجه نذر بونیاری	
		پهاڑی زبان و ادب دی تاریخ: راجه نذر بونیاری	
		شیرازه پهاڑی (زبان نمبر) کلچرل اکیڈمی	
		گوجری زبان و ادب: رام پرشاد کهٹانه	
		گوجری ادبیات: ڈاکٹر رفیق انجمّ	
		ادب ته ادیب: عبدالحق نعیمیؔ	
		پهاڑی افسانوی ادب: جهانگیر دانش	
		پرکھ پرچول: نثار حسین راہیؔ	
		لعلاں کا بنجارا : ڈاکٹر رفیق انجمّ	
		منشاء خاکی: نثر بہار	

Semester-IV

COURSE TITLE: Jadid Gojri& Pahari Adabi Tanqeed
COURSE CODE: MGP-402
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-402	**COURSE TITLE: Literary Criticism: ادبی تنقید**	
	UNIT I Literary Criticism: An overview	**یونٹ!: ادبی تنقید: اک تعارف**	
	• Origin & Development	تنقید: تعریف، ابتدا تے ارتقا	
	• Scope & Principles	ادبی تنقید:اہمیت تے اصول	
	• Types & Traditions	ادبی تنقید: روایت تے اقسام	
	UNIT II: Gojri Literary Criticism	**یونٹ2: گوجری ادبی پرکھ پرچول** (عمومی جائزہ)	
	• Origin & Development	ابتدا تے ارتقاء	
	• Literary Criticism in theory & Practice	نظری تے عملی تنقید	
	• Present Scenario	موجودہ صورتحال	
	UNIT III: GojriLiterary Critics	**یونٹ3: نمائیندہ ادبی پارکھ** (خصوصی مطالعہ)	
	• Iqbal Azeem Chaudhary: Editorials	اقبال عظیمؔ چودھری: ادارئے	
	• Dr. Rafique Anjum: Banjara	ڈاکٹر رفیق انجمؔ: بنجارا(تذکرہ نگاری)	
	• Mansha Khaki: Nasr Bahar	منشاء خاکی: نثر بہار	
	UNIT IV: Modern Pahari Criticism-I	**یونٹ4: پہاڑی ادبی پرکھ پرچول** (عمومی جائزہ)	
	• Origin & Development	ابتدا تے ارتقاء (عمومی جائزہ)	
	• Theoretical & Practical Criticism	نظری تے عملی تنقید	
	• Present Scenario	موجودہ صورتحال	
	UNIT V: Some Pahari Literary Critics	**یونٹ5: نمائیندہ ادبی پارکھ** (خصوصی مطالعہ)	
	• Raja Nazar Boniari: Nimmal	نِمل: راجہ نذر بونیاری	
	• Zafar Iqbal Manhas: Editorials	ادارئے: ظفر اقبال منہاس	
	• Nisar Rahi: ParkhParchol	پرکھ پرچول: نثار راہیؔ	

Note for Paper Setting:
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	RECOMMENDED BOOKS : COURSE CODE : MGP-**402**		
		بوطیقا: ارسطو	
		مقدمه شعرو شاعری الطاف حسین حالی	
		تنقید کیا ہے آل احمد سرور	
		گوجر، گوجری زبان و ادب: رام پرشاد کھٹانہ	
		گوجری ادب کی سنہری تاریخ: ڈاکٹر رفیق انجم	
		لعلاں کا بنجارا: ڈاکٹر رفیق انجم	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		پیر پنچال ۓ پہاڑی قلمکار: ڈاکٹر لیاقت نیر	
		پرکھ پرچول: نثار حسین راہی	
		ادبیات پیر پنچال: جاوید انور	
		ادب ته ادیب: عبدالحق نعیمیؔ	
		لِکھتاں پیار دیاں(تحقیقی ۓ تنقیدی مقالے): عبدالرشید قریشی	
		منشاء خاکی: نثر بہار	

Semester-IV

COURSE TITLE: Jadid Gojri& Pahari Non-Fiction Prose
COURSE CODE: MGP-403
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Exam. : 60
Sessional Assessments: 40
Minimum Marks: 24

	COURSE CODE: MGP-403	**COURSE TITLE:Non-Fiction Prose غیرافسانوی نثر**	
	UNIT I: Non-Fiction Prose: An Introduction	**یونٹ!: غیر افسانوی ادب**	
	• Definition & early Development	تعریف، ابتدا تے حدود	
	• Types & Traditions	روایت تے اقسام	
	• Modern Trends	جدید رجحانات	
	UNIT II: GojriNon-Fiction Prose-I	**یونٹ2: گوجری غیر افسانوی ادب-1**	
	• Origin & Development	شروعات تے سفر	
	• Types & Traditions	روایت تے قِسم	
	• Problems & Prospects	معیار تے مسائل	
	UNIT III: GojriNon-Fiction Prose-II	**یونٹ3: گوجری غیر افسانوی ادب-2**	
	• Gojri Journalism: Sarwari Kasana, GR Asghar, Shaukat Javed	گوجری صحافت: سروی کسانہ(گوجر دیس)، غلام رسول اصغر(حمایت)، شوکت جاوید (آواز گوجر)	
	• Articles& Sketches	انشائیہ ، اداریہ، مضمون	
	• Editorials & Essays	سوانح ، خود نوشت، سفر نامہ، خاکہ وغیرہ	
	UNIT IV: Pahari Non-Fiction Prose-I	**یونٹ4:پہاڑی غیر افسانوی ادب**	
	• Origin & Development	شروعات تہ سفر	
	• Definition & Types	روایت تہ قِسماں	
	• Estimate and Newer Challenges	معیار تے مسائل	
	UNIT V: Pahari Non-Fiction Prose-II	**یونٹ5: پہاڑی تے نمائیندہ غیر افسانوی ادب-2**	
	• Pahari Journalism	پہاڑی صحافت: ظفر اقبال، مقبول ساحل:	
	• Essay /Article writing	انشائیہ ، اداریہ، مضمون	
	• Biographies/travelogues etc.	سوانح ، خود نوشت، سفر نامہ، خاکہ وغیرہ	

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	RECOMMENDED BOOKS :COURSE CODE: MGP-**403**		
		آداب صحافت جان محمد آزاد	
		گوجری صحافت: ڈاکٹر شاہ نواز کھٹانہ	
		ادب تہ ادیب: عبدالحق نعیمیؔ	
		گوجری ادبیات: داکٹر رفیق انجمؔ	
		شیرازہ پہاڑی زبان نمبر جموں کشمیر کلچرل اکیڈمی	
		گوجری ادب کی سنہری تاریخ: ڈاکٹر رفیق انجمؔ	
		پہاڑی زبان و ادب دی تاریخ: راجہ نذر بونیاری	
		پرچول: عبدالمجید حسرت	
		گوجری نثریات: ڈاکٹر رفیق انجمؔ	
		پرکھ پرچول: نثار راہیؔ	
		پہاڑی اور اُردو ایک تقابلی جائزہ: کریم اللہ قریشی	
		لِکھتاں پیار دیاں(تحقیقی تے تنقیدی مقالے): عبدالرشید قریشی	

Semester-IV

COURSE TITLE: GojriTarjuma Nigari (Translations) **Maximum Marks: 100**
COURSE CODE: MGP-404 **University Exam. : 60**
Credits: 4 **Sessional Assessments: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

	COURSE CODE: MGP-404 COURSE TITLE: Translation/Tarjuma Nigari ترجمہ نگاری		
	UNIT I: An overview	**یونٹ!: ترجمہ نگاری: اک تعارف**	
	• Origin & Development	ابتدا تے فن	
	• Types & Traditions	روایت تے اقسام	
	• Problems & Prospects	مواقع اور مسائل	
	UNIT II: GojriTranslations- I: An overview	**یونٹ2: گوجری ترجمہ نگاری**	
	• Origin & Development	ابتدا تے ارتقاء	
	• Tradition & Future Prospects	روایت تے گنجائش	
	• Challenges	گوجری ترجمہ کا مسائل	
	UNIT III:Gojri Translators- II Selected Works	**یونٹ3: نمائیندہ ترجمہ نگار**	
	• Mufti Faiz ul-Waheed	مفتی فیض الوحید: تفسیر قران الکریم	
	• Ch. Naseem Poonchi	نسیم پُونچھی: مثنوی مولان روم	
	• Ch. Hassan Parwaz	حسن پرواز: میں ازمایو سچ(مہاتما گاندھی)	
	UNIT IV: Pahari Translations-I: An overview	**یونٹ 4: پہاڑی ترجمہ نگاری**	
	• Origin & Development	ابتدا تے ارتقاء	
	• Tradition & Scope	روایت تہ امکانات	
	Problems & Prospects	پہاڑی ترجمہ نے مسائل	
	UNIT V: Pahari Translations—II Selected Works	**یونٹ5:نمائیندہ پہاڑی ترجمہ نگار**	
	• Pahari Translation of Quran:	مفتی شفیق الرحمٰن (ترجمہ قران الکریم)	
	• Pahari Translation of Khayam'sRubaies	فدا راجوروی(رباعیات خیام)	
	• Pahari Translation of Vovel: *Shakast*	محمد شفیع میر: شکست(کرشن چندر)	

Note for Paper Setting:
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	RECOMMENDED BOOKS :COURSE CODE: MGP-**404**		
		گوجری ادب کی سنہری تاریخ ڈاکٹر رفیق انجمّ	
		گوجری نثریات: ڈاکٹر رفیق انجمّ	
		پہاڑی زبان دی تاریخ: راجہ نذر بونیاری	
		رباعیات خیام: پہاڑی ترجمہ: فدا راجوروی	
		مثنوی مولانا روم: گوجری ترجمہ: نسیم پُونچھی	
		مثنوی مولانا روم: پہاڑی ترجمہ: ڈاکٹر صابر مرزا	
		قران الکریم: گوجری ترجمہ و تفسیر: مفتی فیض الوحید	
		قران الکریم: پہاڑی ترجمہ : مفتی شفیق الرحمٰن	

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Semester-IV

COURSE TITLE: Dissertation Writing
COURSE CODE: MGP-405
Credits: 4

Maximum Marks: 100
Dissertation: 60
Viva voces: 40

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Centre for Research in Gojri, Pahari & Kashmiri Languages
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The Revised/Updated Syllabus of MA Gojri & Pahari

A: Course Contents Replaced/Deleted

COURSE	UNIT	CONTENT	REPLACEMENT/ DELETION
MGP-104	V	لوک بار: شمس‌ملدیال تے راج ولی	پہاڑی لوک بار: عمومی جائزہ
MGP-202	I	محمد بُوٹا، زمان چن،	سائیں قادر بخش، سائیں فقر دین
MGP-203	III	قصیدہ تے مرثیہ : رانا فضل،اسرائیل اثر	قصیدہ تے مرثیہ کی روایت
MGP-301	III	صابر آفاقی: سینو زخمی، اک جذبو لیکے جلیاں ما،	سروری کسانہ: رات کلکھنی بال، لمڑاہ راہ
		مُخلص وجدانی: پورو ہور ارمان، جے احسان مکانو	اقبال عظیم: لُکھیں لکھیں رات، جھُوٹھا قول قرار
MGP-302	III	نعت: رانا فضل حسین،	نعت: سروری کسانہ: نبیاں کا سردار نبی
		نظم: اسرائیل مہجور، صابر آفاقی،	Deleted
		گیت: ذبیح راجوروی، رانا فضل حسین،	اقبال عظیم: خیراں نال رب آنے
MGP 307		Special Study of Mian Muhammad Baksh (3rd optional)	Deleted (3rd optional)
		ڈاکٹر صابرؔ آفاقی: گوجری ادب	منشاء خاکی: نثر بہار

B: List of Books Deleted from Recommended Books

COURSE		
MGP-101		شاہان گُجر: مولانا عبد المالک چوہان
		تاریخ گجراں: رانا علی حسن چوہان
MGP-102		تاریخ ادب اُردو: جمیل جالبی
MGP-103		تاریخ ادب اُردو: جمیل جالبی
MGP-104		گوجری پہاڑی لوک گیت: ڈاکٹر غلام حسین اظہرؔ
MGP_105		ہک لسانی پوہچ(پہاڑی گرائمر) : سید آصف شاہ
		Gojri& Hindko: Linguistic Survey of Northern Pakistan
		Gojri Orthography, 2002, Wyne E. Lucey LSNP Pakistan
MGP-202		زمان(شہنشاہِ مجاز) محمد صدیق جرال
MGP-204		فن افسانہ نگاری وقار عظیم
MGP_205		شاہان گوجر: عبدالمالک چوہان
		تاریخ گجراں: رانا علی حسن چوہان
		تاریخ زبان اُردو: جمیل جالبی
MGP-301		بوطیقا عزیز احمد
MGP-303		فن افسانہ نگاری وقار عظیم
MGP-401		آب حیات محمد حسین آزاد
MGP-**402**		آب حیات محمد حسین آزاد
		پہڑاس(تحقیقی تے تنقیدی مقالے): میر حیدر ندیم
		پہاڑی اور اُردو ایک تقابلی جائزہ: کریم اللہ قریشی
MGP-**4**03		پہڑاس(تحقیقی تے تنقیدی مقالے): میر حیدر ندیم

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Semester-IV

COURSE TITLE: Dissertation Writing **Maximum Marks: 100**
COURSE CODE: MGP-405/ Credits:04 **Dissertation: 60**
Course Title: Dissertation/ Project **Viva voces: 40**

Dissertation Topics:

01-MGP-2022	Mohd Fareed	Ameen Qamar: Life & Contributions
02-MGP-2022	Masood Ahmed	Dr. M. K. Waqar: Literary Contributions
04-MGP-2022	Ajaz Ahmed	Iqbal Azeem: Life & Contributions
05-MGP-2022	Fazal Ahmed	Hassan Din Hassan: Life & Works
06-MGP-2022	Shazia Mumtaz	Khuda Bakhsh Zar: Life & Contributions
07-MGP-2022	Faiza Rafiq	K. D. Maini: Life & Contributions
08-MGP-2022	Saleem Shah	Hakam Shah Qamar: Life & Works
09-MGP-2022	Mohd Sahil	Naseem Poonch: Life & Works
10-MGP-2022	Jhangir ul Haq Khan	Dr. Sabir Mirza: Life & Contributions
11-MGP-2022	Majad Majeeb	Shahbaz Rajourvi: Life & Contributions
01-MGP-2022	Mohd Fareed	Ameen Qamar: Life & Contributions
02-MGP-2022	Masood Ahmed	Dr. M. K. Waqar: Literary Contributions
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06-MGP-2022	Shazia Mumtaz	Khuda Bakhsh Zar: Life & Contributions
07-MGP-2022	Faiza Rafiq	K. D. Maini: Life & Contributions
08-MGP-2022	Saleem Shah	Nisar Rahi: Life & Works
09-MGP-2022	Mohd Sahil	Naseem Poonch: Life & Works
10-MGP-2022	Jhangir ul Haq Khan	Dr. Sabir Mirza: Life & Contributions
11-MGP-2022	Majad Majeeb	Shahbaz Rajourvi: Life & Contributions
01-MGP-2022	Mohd Fareed	Ameen Qamar: Life & Contributions

Note: All the students are required to prepare and submit the hardcopies of their Dissertation by April 30, 2024 and get ready for presentations of the same as per schedule. There will be no change in topics once selected.

No: BGSBU/CRGPKL/23/
Date: 30/05/2023

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