FIRST SEMESTER SYLLABUS

M. Sc. MATHEMATICS

APPLICABLE TO BATCHES

2024 - 2026

2025 - 2027

2026 - 2028

BABA GHULAM SHAH BADSHAH UNIVERSITY RAJOURI, J&K, INDIA

FIRST SEMESTER

COURSE CODE	COURSE TITLE	NO. OF CREDITS	DISTRIBUTION OF MARKS		
CORE COURSES			SA	UE	TOTAL
MM - 101	Real Analysis - I	4	40	60	100
MM - 102	Theory of Metric Spaces	4	40	60	100
MM - 103	Theory of Measure and Integration	4	40	60	100
MM - 104	Abstract Algebra	4	40	60	100
MM - 105	Complex Analysis - I	2	20	30	50
MM - 106	Set Theory	2	20	30	50
MM - 107	C - Programming	2	25	25	50
MM - 108	Lab Course on MS-107	2	20	30	50
	TOTAL	24	245	355	600

SEMESTER - I

Course Title	Real Analysis - I	Maximum Marks	100
Course Code	MM-101	University Examination	60
Credits	4	Sessional Assessment	40
		Duration of Exam.	3 HOURS

Objectives …..................		The objective of this course is to study in depth the Riemann Integral, pointwise and uniform convergence of functions, functions of bounded variation and Power series.
UNIT 01	Riemann Integral-I	Upper and Lower sums / integrals with properties; Riemann integrable function; Riemann's criterion of existance of Riemann integral; relation of Riemann integrability with continuity and monotonicity; Darboux theorem; Riemann integrability condition in terms of Riemmann sum; Riemann integrability of a function discontinuous at a finite number of points; Properties of Integral - Linearity, positivity & monotonicity property.
UNIT 02	Riemann Integral (RI) -II	Riemann integrability on subintervals; Mean Value theorem; Composition of a RI function with a continuous function; Modulus of a RI function; Product of RI functions; The fundamental theorems of calculus - I & II; First and second substitution rules; Integration by parts; Integration of vector valued functions; Rectifiable curves; Improper Integrals - Unbounded integrand & Unbounded interval, the integral test.
UNIT 03	Sequences and Series of Functions	Point-wise and uniform convergence of sequence & series of functions - Cauchy criterion for uniform convergence and connection of uniform convergence with continuity, integrabilty & differentiability; Example of a continuous nowhere differentiable function and Weirstrass approximation theorem; Various test of uniform convergence of series of functions - Weirstrass M - test, Abel's partial summation formila, Drichlet test & Abel's test.
UNIT 04	Power Series	The concept of power series; Cauchy - Hadamard theorem; existence of derivatatives of all orders of a power series; Uniqueness of power series; Multiplication of power series; The substitution theorem; Reciprocal of a power series; Tayloe series generatred by a function; Bernstein theorem; Abel limit theorem; Tauber's theorem.
UNIT 05	Functions of Bounded Variation	Monotonic functions - existance of RHL & LHL, set of discontinuties is atmost countable; Functions of bounded variation and their sum, difference and product; total variation; additive property of total variation; total variation on [a,x] as a function of x; Functions of bounded variation as a difference iof monotonic functions; Continuous functions of bounded variation.

COURSE OUCOMES

On successful completion of this course, we expect that a student can explain

1 Upper and Lower sums, upper and lower integrals with their properties and the concept of Riemann integrable function.

2 Riemann's criterion of existance of Riemann integral, relation of Riemann integrability with continuity and monotonicity and Riemann integrability of a function discontinuous at a finite number of points.

3 elementary properties of Rieman Integral such as Linearity, positivity, monotonicity,Riemann integrability on subintervals, Mean Value theorem and Composition of a RI function with a continuous function.

4 The fundamental theorems of calculus - I & II, First and second substitution rules and integration by parts

5 Integration of vector valued functions, Rectifiable curves and Improper Integrals.

6 Point-wise and uniform convergence of sequence & series of functions and connection of uniform convergence with continuity, integrabilty & differentiability.

7 an example of a continuous nowhere differentiable function and Weirstrass approximation theorem and Various test of uniform convergence of series of functions.

8 The concept of power series and related concepts and results.

9 Monotonic functions and functions of bounded variations along with their properties.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. Al - Gwaiz, M.A.& Elsanousi, S.A.(2015), Elements of Real Analysis, 3rd edition, CRC Press (Taylor & Francis Group).

2. Rudin, W., (1976), Principles of Mathematical Analysis, 3rd edition, McGraw Hill International Edition.

REFERENCE BOOKS

1. Bilodeau, G. G., Thie, P. R. and Keough, G.E (2010), An Introduction to Analysis, second edition, Joes and Bartlett Learning.

2. Apostol, Tom M., (2002), Mathematical Analysis, 1st edition, Narosa Publishing House.

SEMESTER - I

Course Title	Theory of Metric Spaces	Maximum Marks	100
Course Code	MM-102	University Examination	60
Credits	4	Sessional Assessment	40
		Duration of Exam.	3 HOURS

Objectives …………………		The aim of this course is to expose the students to the world of "Metric Spaces" which plays a vital role in understanding various areas of Analysis such as Functional Analysis, Real & Complex Analysis, Operator theorey etc.
UNIT 01	Metric spaces and point set Topology in Metric spaces	Definition and examples of metric spaces; Holder and Minkowski inequality for finite and infinite sums; Rn and real little lp ($1 \leq p \leq \infty$) as vector and metric spaces; the space of all real valued bounded functions as vector and metric space; metrices induced by given metric(es); open and closed balls; Open and closed sets with their elementry properties; Adherent, accumulation, interior and boundary points of a set.
UNIT 02	Complete and separable Metric Spaces	Convergent sequences in a metric space with basic properties & their connection with adherent points of a set; relation b/w convergence & component - wise convergence in Rn and little lp spaces; Cauchy sequences in a metric space; complete metric spaces with standard examples - Rn and little lp spaces; Cantor's intersection theorem; Nowhere dense sets; Baire's category theorem; Dense sets; separable metric spaces.
UNIT 03	Compact Metric spaces	Definition & examples; Closed and boundedness of compact sets; Union and intersection of compact sets; Spaces with Bolozano- Weirstrass property (BWP); sequentially compact spaces (SCMS); Lebesgue Covering Lemma; Relation b/w Compact spaces with SCMS & spaces with BWP; Totally bounded sets (TBS); Compactness in terms of complete & TBS; Compactness in Rn - Bolozano- Weirstrass theorem, Lindeloff covering theorem and Heine Borel theorem.
UNIT 04	Continuity & Uniform continuity	Continuous function (CF) on a metric space; relation of continuity with inverse images of open sets / closed sets / convergence of sequences; component - wise continuity criterion for a function from Rn to Rm; Continuous image of an open / closed / compact set; boundedness of CF on a CS; Continuity of inverse of a bijective CF on a CS; Uniform continuity (UC); relation b/w continuity and UC.
UNIT 05	The Space of continuous functions & Metric subspaces	The space of real valued bounded CFs (defined on a metric space X) C(X) as a metric space; completeness of C(X); Equicontinuous famliy of functions defined on a compact metric space; the concept of uniformly convergent sequence; Relation b / w equicontinuous sequence and uniformly convergent sequence; charecterization of compact sets in C(X) - Ascoli thereom; The concept of metric subspace (MSS); structure of open and closed sets in a MSS.

COURSE OUCOMES

On successful completion of this course, we expect that a student should be able to explain

1. the concept and examples of metric spaces and its standard examples such as Rn, little lp ($1 \leq p \leq \infty$) spaces, spaces of continuous functions etc.
2. the concept of open and closed balls; Open and closed sets; adherent, accumulation, interior and boundary points of a set.
3. the concepts of convergent and Cauchy sequences in a metric space - in particular in Rn and lp spaces.
4. the Cantor's intersection theorem, Baire's category theorem and separable metric spaces.
5. the concept & examples of compact sets; Spaces with Bolozano- Weirstrass property; sequentially compact spaces and relation between them.
6. the concept of totally bounded sets and Compactness in terms of complete & Totally Bounded sets.
7. Bolozano- Weirstrass theorem, Lindeloff covering theorem and Heine Borel theorem in the Euclidean space Rn.
8. the concept of continuous functions and its various charecterizations - in particular in Rn.
9. the concept of uniform continuity & its relation with continuity.
10. the Fixed point theorem and its application to ODE.
11. the concept of equicontinuous famliy of functions and uniformly convergent sequence and relation between therm.
12. the charecterization of compact sets in C(X) - Ascoli thereo and the concept of metric subspace.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. **Apostol, Tom M., (2002),** Mathematical Analysis, 1st edition, **Narosa Publishing House.**

2. **Simmons, G.F. (1983),** Topology and Modern Analysis, second Edition, **Robert E. Krieger Publishing Company Malabar, Florida.**

REFERENCE BOOKS

1. **Adams, C. and Franzosa, R. (2009),** Introduction to Topology – Pure and Applied, **Pearson.**

2. **Munkers, J.R. ,(2000),** Topology, 2nd Edition, **PHI.**

3. **Searcoid, M. O., (2007),** Metric Spaces, **Springer.**

4. **Willard, S., (1976),** General Topology, **Dover Publications New York.**

5. **Patty, C.W. (2010),** Foundations of Topology, **second Edition, Jones and Barlet.**

SEMESTER - I

Course Title	Theory of Measure and Integration	Maximum Marks	100
Course Code	MM-103	University Examination	60
Credits	4	Sessional Assessment	40
		Duration of Exam.	3 HOURS

Objectives …...................		The aim of this course is to introduce the students with the basic ideas and methods of measure theory and Integration.
UNIT 01	Measure Spaces	Sigma- algebra of a sets, Limit of sequences of sets, Generation of sigma algebra, borel sigma algebra, measure on sigma algebra, measures of a sequence of sets, measureable space and measure space, outer measure.
UNIT 02	Lebesgue Measure	Lebesgue outer measure on R, properties of the lebesgue measure space,Translation invariance of legesgue outer measure and lebesgue measure space, Existence of non- lebesgue measureable sets, Regularity of Lebesgue outer measure.
UNIT 03	Measureable Functions	Measurability of a function, operations with measureable functions, Equality almost everywhere, sequence of measureable function, Continuity and Borel and Lebesgue Measurability of functions on R, Convergence and uniform convergence almost everywhere, D.E Egroff Theorem.
UNIT 04	Lebesgue Integral	Simple function, Integration of simple function, Integration of bounded functions on sets of finite measure, Integral of non-negative extended real valued measureable function, bounded convergence theorem, Monotone convergence theorem, Integral of Measureable functions, Fatou's lemma.
UNIT 05	LP- spaces	Convex function-Jensen's Inequality, LP spaces- Young's inequality, Holder's inequality, Schwartz's inequality Minkowski's inequality, relation among the LP spaces; Approximations by continuous functions.

COURSE OUTCOMES

On successful completion of this course, we expect that a student

1 explain the concept, examples and properties of sigma algebra, measures of sequence of sets.

2 explain the concept of outer measure, lebesgue outer measure and properties of lebesgue outer measure.

3 explain the concept of existence of non-lebesgue measureable sets.

4 explain the concept, examples and properties of Measureable space, Measureable sets.

5 explain the concept, examples and properties of Measureable functions, Borel sets.

6 explain the concept, examples and properties of integral of measureable function.

7 explain some fundamental theorems such as monotone convergence theorem, Fatou's lemma, D.Egoroff theorem.

8 explain the concepts of L^p-space and its various features such as completeness .

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. **Royden, H.L., (2006), Real** Analysis, 3rd edition, **Prentice-hall of India Private Limited.**

2. **Yeh, J., (2000),** Lectures on Real Analysis, **World Scientific.**

REFERENCE BOOKS

1. **Rudin, W.,(1987),** Real and Complex Analysis**, 3rd Edition, Tata Mcgraw-Hill Edition.**

2. **Bauer, H. (2001),** Measure and Integration Theory, **Walter de Gruyter**

3. **Axler, S. (2024),** Measure, Integration & Real Analysis, **Springer.**

SEMESTER - I

Course Title	Abstract Algebra	Maximum Marks	100
Course Code	MM-104	University Examination	60
Credits	4	Sessional Assessment	40
		Duration of Exam.	3 HOURS

Objectives …...................		The main objective of this course is to introduce students to the fundamentals of abstract algebra- group and ring theory.
UNIT 01	Class equation, Cauchy Theorem and Sylow's theorems	Conjugate of an element of a group; class equation and its applications - non-triviality of centre of a group of order pn, Converse of Lagrange's theorem for abelian groups, Cauchy's theorem; number of a conjugate classes in S_n; 1st part of Syllow's theorem; 2nd and 3rd parts of Syllow's theorem(Proofs not included); Applications of Syllow's theorem to determine simplicity of groups of order 42, 20449,pq(p,q primes), 56, 30, An, 108, 72, 108 and 60.
UNIT 02	Central and composition series of a group	Upper and lower central series of a group; nilpotent group and its subgroups, quotient groups and homomorphic image; charecterstic subgroup of a group; nilpotent group as a product of Syllow subgroups; Norml and composition series of a group; Jordan - Holder theorem.
UNIT 03	Ring theory	Review of the concept of ring, ID, field, subring, ideal (structure of ideal generated by a single element), quotient ring, maximal & prime ideal, Homomorphism (All homorphisms from Z to Z, Q to Q, R to R & C to C); characteristic of a ring; embedding of a ring in to a ring with unity & of an integral domain in to a Field; the field of quotients of an integral domain; relation b/w two fields of quotients of an ID; embedding of a ring in to a ring of endomorphisms.
UNIT 04	Divisibility in Rings, Principal Ideal Domaon and Euclidean Domain	The concept of division, gcd, units, associates, irreducible and prime elements in a commutative ring with identity; Principal Ideal Domain - relation between prime and irreducible elemnents, existence of HCF, Bézout's identity, relation between maximal ideals and irreducible elements; Euclidean Domain - relation b/w PID and ED, algorithm to find gcd, charectrisation of units and proper divisors in terms of Euclidean valuation.
UNIT 05	Unique Factorisation Domain and Polynomial Rings	Unique Factorisation Domain - relation of UFD with PID and ED, relation b/w prime & irreducible elemnents, existence of HCF; The ring R[x] of Polynomials over a ring R - degree of a polynomial, F[x] as ED, charecterisation of Units in R[x], Einstein's criteria, primitive polynomials, Gauss lemma, Gauss theorem, the field of rational functions.

COURSE OUTCOMES

On successful completion of this course, we expect that a student is able to explain

1 the concept of conjugate of an element, class equation and its applications - non-triviality of centre of a group of order pn, Converse of Lagrange's theorem for abelian groups & Cauchy's theorem

2 Syllow's theorem and its applications to determine simplicity of groups of various orders such as 42, 20449,pq(p,q primes), 56, 30 etc.

3 the concept of upper / lower central series of a group and nilpotent group.

4 the concept of Norml and composition series of a group - Jordan - Holder theorem.

5 the concept of ring, ID, field, subring, ideal, quotient ring, maximal & prime ideal & Homomorphism.

6 the concept of characteristic of a ring and ring embeddings - the field of quotients of an integral domain.

7 the concept of division, gcd, units, associates, irreducible and prime elements in a commutative ring with identity.

8 the concept of Principal Ideal Domain, Euclidean Domain and relation between them.

9 the concept of Unique Factorisation Domain and its relation PID and ED.

10 the The ring R[x] of Polynomials over a ring R - Einstein's criteria, Gauss lemma and Gauss theorem.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. **Gallian, J. A. (1998),** Contemporary Abstract algebra, **Fourth edition**, **Narosa.**

2. **Gopalakrishnan, N. S. (1986),** University Algebra, **Second edition**, **New Age International Limited.**

3. **Zameeruddin, Q., I.N,(2009),** Modern Algebra, 8ndedition, **Vikas Publishing House.**

REFERENCE BOOKS

1. **Artin, M., (2010),** Algebra, 2nd edition, **Springer.**

2. **Farmer, D.W., (1963),** Groups and Symmetry: A Guide to Discovering Mathematics, **American Mathematical Society.**

3. **Herstein, I.N,(2004),** Topics in Algebra, 2ndedition, **Wiley.**

4. **Levinson, N., (1970),** Coding Theory: A Counter Example to G. H. Hardy's Conception of Applied Mathematics, AMS Monthly 77: 249-258

SEMESTER - I

Course Title	Complex Analysis -I	Maximum Marks	50
Course Code	MM-105	University Examination	30
Credits	2	Sessional Assessment	20
		Duration of Exam.	2 HOURS

Objectives …....................		The aim of this course to teach the students the fundamentals of Complex Analysis and a detailed view of elementry complex functions.
UNIT 01	The field of Complex Numbers	The field of Complex numbers; Polar form of a complex number; Principal nth root; The topology of complex numbers - connected sets; Complex functions - Möbius Transformation, extended complex plane, Stereographic Projection; Introduction to convergence of sequences and series of complex numbers.
UNIT 02	Analytic Functions	Limit and continuity of a complex function with elementary properties - the continuity of the Argument function; Branches of a function; Analytic funtion; Cauchy Rieman equations and their relationship with analiticity; consequences of Cauchy Riemann equations; Hormonic functions and their connection with analytic functions.
UNIT 03	Special Functions	Power series - radius of convergence & infinite differentiability; The complex exponential & logarithmic functions with elemntary properties; Complex exponents; Complex trigonometric functions with their properties; Inverse trigonometric functions.

COURSE OUTCOMES

On successful completion of this course, we expect that a student

1 is able to explain the field of Complex numbers, connected sets, extended complex plane and Complex functions such as Möbius Transformation & Stereographic Projection.

2 is able to explain the convergence of sequences and series of complex numbers.

3 is able to explain limit and continuity of a complex functions and the concept of branches of a function.

4 is able to explain the concept of analytic funtion,its relation with CR equations and the concept of hormonic functions.

is able to explain the concept of power series its adius of convergence & infinite differentiability.

5 is able to explain various properties (especially continuity & differentiability) of the elemntary complex functions such as exponential,logarithmic, and trigonometric functions.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 06 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 06 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 08 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. Mathews, J. H. & Howell, R. W., (2006), Complex Analysis for Mathematics and Engineering, 5th edition, B Jones and Bartlett Publishers Ansari,M.R, (2006) Protecting Human Rights, New Delhi.

2. Matthias, B., Gerald,M., Dennis, P. & Sabalka, L. (2018), A First Course in Complex Analysis, Orthogonal Publishing, l3c Ann Arbor, Michigan (www.orthogonalpublishing.com).

REFERENCE BOOKS

1. Ahlofrs, L. R., (1996), Complex Analysis, McGraw Hill.

2. Brown, J. W. and Churchill, R. V., (2009), Complex Variables and Applications, 8th Edition, McGraw-Hill International.

3. Palka, B. P. (1991), An introduction to complex function theory, Springer.

SEMESTER - I

Course Title	Set Theory	Maximum Marks	50
Course Code	MM-106	University Examination	30
Credits	2	Sessional Assessment	20
		Duration of Exam.	2 HOURS

Objectives ….................... The aim of this course is to introduce the students with the ideas of advanced set theory such as countablity, cardinal numbers, ordinal numbers and Axiom of choice.

UNIT 01	Finite and Infinite Sets	Equipotent sets; Finite, denumerable, countable and uncountable sets; Equipotency of Z, Q & N X N with N, non - equipotency of (0, 1) with N, equipotency of (0, 1) & P(N) with R, non - equipotency of a set A with P(A), equipotency of P(A) with the collection of all functions with domain A and co - domain {0, 1}; Existance of a denumerable set in an infinite set; Equipotency of an inifite set with one of its subsets; A denumerable (Countable) union of denumerable (Countable) sets is denumerable(Countable); Catesian product of two denumerable (Countable) sets.
UNIT 02	The Axiom of Choice and Related Principles	Partially ordered, well ordered and Totally ordered sets; Order Isomorphism; Maximal and minimal elements; Choice function; The Axiom of choice; Hausdorff's Maximal Principle; Zorn's Lemma; The well ordering theorem; Equivalence of all the four mentioned principles.
UNIT 03	Cardinal and Ordinal numbers	The Axiom of Cardinality; Sum and product of cardinal numbers - associativity and commutativity; Distributive; cardinal exponentiation with elementary properties; ordering of cardinal numbers - Schröder-Bernstein theorem, Well orderedness of each class of cardinal numbers; rules of inequality for cardinal numbers; Special properties of infinite cardinal numbers - the continum hypothesis; Infinite sums and products of cardinal numbers; Introduction to the ordinal numbers - the axiom of ordinality.

COURSE OUCOMES

On successful completion of this course, we expect that a student is able to

1 Explain the basic difference between finite, infinite, countable, uncountable sets and their various properties.

2 Explain various examples of finite, infinite, countable and uncountable sets.

3 explain the concept of Partially ordered, well ordered and Totally ordered sets and is able to explain the concept of Order Isomorphism, Maximal and minimal elements in an ordered set.

4 to explain the axiom of Choice and its various eqiuivalent forms.

5 explain the Axiom of Cardinality and ordinality.

6 explain various arithmetic operations on cardinal numbers.

7 explain the continum hypothesis.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 06 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 06 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 08 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. **Printer, C. C. (2014),** A Book of Set Theory, **Dover Publications, INC. Mineola, New York**

REFERENCE BOOKS

1. **Hrbalek, K. and Jech, T.,(1999),** Introduction to set theory,3rd edition, **Marcel Dekker, Ind.**

2. **Halmos, P., (2011),** Naïve set theory, **Martino Fine Books.**

3. **Lin You Feng, Schu Yeng, (1981),** Set Theory with Applications, **Second edition, Mariner Publishing Compan**

4. **Enderton , H. B., (19771),** Elements of Set Theory, **Academic Press.**

SEMESTER - I

Course Title	C - Programming	Maximum Marks	50
Course Code	MM-107	University Examination	30
Credits	2	Sessional Assessment	20
		Duration of Exam.	2 HOURS

Objectives …………………		The course is designed to enhance students analyzing and problem solving skills and to provide knowledge of Programming . Students will be able to develop logics which will help them to create programs, and applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.
UNIT 01	Introduction to Problem Solving	Introduction to Programming; Concept of Programming Languages; Categories of Programming Languages; Introduction to Algorithms and Flowcharts; Characteristics of algorithms; Algorithm design tools - Pseudo code and flowchart.
UNIT 02	C - Language & Operators in C	A brief history of C, Features, Structure & Life Cycle of a C- Program; C tokens ; Character Set in C; Keywords, & Identifiers; Basic Data Types - Variables & Constants; Operaors - Arithmetic, Relational, Equality, Logical, Unary, Conditional, Bitwise, Assignment, Comma and Sizeof Operator.
UNIT 03	Decision Control and Looping Statements; Functions & Arrays	Decision Control and Looping Statements - Introduction, Conditional Branching Statements, Iterative Statements, Nested Loops, Break and Continue Statements and goto Statements; Functions - Introduction, Function Declaration / Function Prototype; Function Definition. Arrays - Introduction and Declaration of Arrays.

COURSE OUCOMES

On successful completion of this course, we expect that a student is able to explain

1. the concept of Programming Languages and their Categories.
2. the concept of Algorithms and Flowcharts with their characteristics and design tools.
3. brief history of C its Features, structure and life Cycle of a C- Program.
4. basic Data Types and various operators such as Arithmetic, Relational, Equality, Logical, Unary, Conditional, Bitwise, Assignment etc.
5. the concepts of decision Control and Looping Statements, Functions & Arrays.

Note for Paper Setting

The question paper will be divided into two sections. Section A will be compulsory and will contain 06 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will contain 06 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 08 marks.

BOOKS RECOMMENDED

TEXT BOOKS

1. **Balaguruswamy, E., (2004),** Programming in ANSI C, 4^{th} edition, **Tata McGraw Hill**.

2. **Saxena, S., (2007),**MS- Office for Everyone, 1^{st} edition, **Vikas Publications, New Delhi**.

3. **Sinha, P.K., (2007),** Computer Fundamentals, 4^{th} edition, **BPB Publications, New Delhi**.

4. **Taxali, R.K., (2007),**PC Software for Windows, 1^{st} edition, **TMH, New Delhi.**

REFERENCE BOOKS

1. **Basandra, K., (2008),** Computers Today, 1^{st} edition, **Galgotia publication, New Delhi.**

2. **Schiltz, H.,(2004),** C: The Complete Reference,4^{th} edition**, Tata McGraw Hill.**

SEMESTER - I

Course Title	Lab course on MM-107	Maximum Marks	50
Course Code	MM-108	University Examination	25
Credits	2	Sessional Assessment	25
		Duration of Exam.	2 HOURS

Objectives …................... The aim of this course is to give hand - on practice of the theoretical part about C- programming learned in the course MM - 107.

* Each student is required to maintain a practical record book.

* Two practical tests, one Internal and one External, are to be conducted.

* Each practical test will be of 25 marks.

* The student has to pass both internal and external practical tests separately scoring a minimum of 10 marks in each test.

COURSE OUCOMES

On successful completion of this course, we expect that a student

1 Should be able to appreciate the use of computers in engineering industry

2 Should have developed in him / her the basic understanding of computers, the concept of algorithms and algorithmic thinking.

3 Should have developed in him / her the ability to analyze a problem and develop an algorithm to solve it.

4 Should know the use of the C - programming language to implement various algorithms.