

**SHRI JAGDISHPRASAD JHABARMAL TIBREWALA UNIVERSITY
JHUNJHUNU,(RAJASTHAN)-333001**



SYLLABUS

**M.Sc. (MATHEMATICS)
TWO YEAR FULL-TIME PROGRAMME
(Four Semester Course)**

**COURSE CONTENTS
(Effective from the Academic Year 2020-2022)**

NAME OF PAPER AND CODE

Semester I				Semester II			
S.N	Code	C.PAPER	Name Of Paper	SN	Code	C.PAPER	Name Of Paper
1	MAT 101	C(i)	ADVANCED ALGEBRA I	6	MAT 201	C(i)	ADVANCED ALGEBRA-II
2	MAT 102	C(ii)	COMPLEX-ANALYSIS	7	MAT 202	C(ii)	REAL ANALYSIS
3	MAT 103	C(iii)	MECHANICS	8	MAT 203	C(iii)	PARTIALDIFFERENTIAL EQUATIONS
4	MAT 104	C(vi)	INTEGRAL EQUATIONS	9	MAT 204	C(vi)	SPECIAL FUNCTION
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9	MAT 304 O(ii)	FLUID DYNAMICS I	9	MAT 404 O(ii)	FLUID DYNAMICS II
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M.Sc. MATHEMATICS



SYLLABUS

M.Sc. – Ist Year (I – SEMESTER)

M.Sc. MATHEMATICS 2020 - 21

MAT 101 :- ADVANCED ALGEBRA I

Unit - I

Linear transformations, Range, Kernel, Rank-nullity theorem, Singular and nonsingular transformations, Vector space of linear transformations. Linear functional, Dual and bidual of a Vector space, Annihilators, Invariance, Projections, Adjoint of a linear transformations.

Unit-II

Matrix representation of a linear transformation, Change of Basis. Transition matrix, Similarity, Eigen values and Eigen vectors for a linear transformation, Cayley-Hamilton Theorem,

Unit - III

Minimal polynomial and minimal equation, Canonical forms, Diagonalization, Reduction to triangular form, Nilpotent transformations. Index of nilpotency. Jordan Canonical form.

Unit-IV

Bilinear form, its matrix representation and rank, Symmetric and skew symmetric bilinear forms,
Quadratic form associated with a bilinear form, Symmetric matrix associated with a quadratic form.
Diagonalization of a quadratic form, Hermitian form and its matrix representation, Positive definite Hermitian form.

Unit V

Inner product spaces, Cauchy-Schwartz inequality, orthogonal vectors. Orthogonal complements, orthonormal sets and bases, Bessel's inequality for a finite orthonormal set. Gram Schmidt orthogonalisation process.

References :

1. I.N.Herstien Topics in Linear Algebra (Wiley Eastern)
2. Sharma &Vashistha Linear Algebra (Krishna Publication)
3. K.Hoffemn&R.Kunje Linear Algebra (Prentice- Hall India Ltd)
8. S. Lang Linear Algebra
- 9 V VVovevodin Linear Algebra (MIR Publications)
- 10.D.S.Chauhan&K.N.Singh Studies in Algebra (JPH, Jaipur)

MAT 102 - COMPLEX-ANALYSIS

Unit-I

Analytic functions, Sterographic projection of complex numbers, Holomorphic complex valued functions and their inverse, Cauchy-Reimann equations, Power series. conformal mapping. Bilinear transformations their properties and classification, Special transforms $w = z^2$, $z = \sqrt{\cdot} \cdot w$, $z = c \sin w$,

Unit-II

complex integration, Cauchy Theorem and integral formula, Poisson's integral formula, Taylor's and Laurent's series

Unit -III

Morera's Theorem. Liouville's Theorem, Maximum modulus principle, Minimal modulus principle, Schwarz's Lemma.

Unit-IV

Classification of Singularities. Branch Points, Riemann Theorem on removable Singularity, open mapping theorem Casoratti-Weierstrass theorem.

Unit - V

meromorphic functions, The argument principle. Roche's Theorem, Residues, Cauchy's residue theorem; evaluation of integrals, branches of many valued function with reference to $\arg z$, $\log z$, z^n
Analytic continuation .

References :

1. Malik- Arora Mathematical Analysis (New Age International Limited)
2. Schaum Series Complex Variable (TataMcgraw Hill)
3. Churchill & Brown Complex Analysis (TataMcgraw Hill)
4. Walter Rudin Real and Complex Analysis (TataMcgraw Hill)

MAT 103- MECHANICS

Unit-I

Moment and product of Inertia- principal axes and Momental Ellipsoid, D'Alembert's principle,

Unit II

Motion about a fixed axis, (General equation of motion).

Unit-III

Generalized Coordinates, Holonomic and Non-holonomic systems, Scleronomic and Rheonomic systems, Generalized potential. Lagrange's equations

Unit-IV

Hamilton's variables, Hamilton canonical equations, Euler's dynamical equations for the motion of a rigid about an axis .

Unit-V

Hamilton's Principle, Principle of least action. Poisson's Bracket, poisson's identity, Jacobi-Poisson Theorem, Hamilton Jacobi equations

Books Suggested

1. Gold Stein : Classical Mechanics (Narosa Publication)
2. P.P. Gupta : Rigid Dynamics (Krishna Prakashan, Meerut.)
3. M. Ray : Dynamics of Rigid Body (Student's and Friend's, Agra)

MAT 104 - INTEGRAL EQUATIONS

Unit-I

Fredholm and Volterra types Linear Integral Equations, Integral Equations of the first and second kinds Solution of Fredholm Integral Equations with separable Kernels.

Unit II

Fredholm types Linear Integral Equations:- Solution by successive substitutions and successive approximations.

Unit-III

Volterra types Linear Integral Equations:- Solution by successive substitutions and successive approximations.

Unit IV

Laplace Transform :- Definition, properties, Laplace transform of derivatives. Laplace Transforms for Integrals, Inverse Laplace Transforms, convolution theorem

Unit-V

Laplace Transform :- Application to Ordinary Differential Equations and Integral Equations.

References:

1. Erwin Kreyszig Engineering Mathematics(New Age Intern. Limited)
- 2 M.D.Raisinghania Integral Transform (S. Chand Pub.)
3. Shanti Swaroop Integral Equations (Krishna Publication Meerut)
4. Pundir&Pundir Integral Equations and Boundary value Problems (Pragati Prakashan Meerut)
5. Gupta and Goyal Integral Transform (KrishnaPrakashan Meerut)
6. I N Snedan Uses of Integral Transform

MAT 105 - NUMERICAL ANALYSIS

Unit I

Solutions of Equations : Solutions and Rate of Convergence of Bisection, Secant method, Regulafalsi, N-R Methods, Chebshev method. N-R Method for non linear equation. Roots of polynomial equations -Bairstaw and Birge-Veta method, Graeffe's root square method .

Unit II

Solution of System of linear equations : Direct methods, Gauss, Gauss-Jordan, Cholesky, Partition, Triangularisation method.**Iterative methods: Jacobi, Gauss-Seidal and Relaxation Methods**

Unit III

Curve Fitting and Approximation : Least square principle, ChebshevApproximation.Matrix inversion and eigen value problem- Power methods, Jacobi method, complex eigen values.

Unit-IV

Numerical Solution of Ordinary Differential Equations : Iterative methods –improved Euler methods. Runge-Kutta methods.Predictor Corrector methods.

Unit V

Stability analysis, Difference methods for Boundary Value Problems (BVP).

References :

1. Jain-Iyenger-Jain Numerical Analysis (New Age International Limited)
2. Chauhan, Vyas&Soni Studies in Numerical Analysis (Jaipur Publishing House)
3. Vedamurthy, S.N. Iyanger Numerical Methods (Vikas Publication House)
- 4 Goyel, Mittal Numerical Analysis (PragatiPrakashan)
5. Gupta Malik Calculus of Finite Difference & Numerical Analysis

M.Sc. MATHEMATICS



SYLLABUS

M.Sc. – Ist Year (II – SEMESTER)

MAT 201 - ADVANCED ALGEBRA-II

Unit-I

Homomorphism theorems on groups, conjugate elements, classes and class equation of a finite group, Sylows Theorem. Cauchy's theorem for finite Abelian group.

Unit-II

Normal and Subnormal series, Composition series, Jordan-Holder Theorem, Solvable groups.

Unit - III

Ideals, Principal Ideal rings, Division and Euclidean algorithm for polynomials over a field, Euclidean rings and domains,

Unit IV

Unique factorization theorems, unique factorization domains. Finite field extension

Unit -V

Algebraic and Transcendental extensions, Separable and Inseparable extensions, Normal extensions, Perfect field.

References :

1. A.R.Vashistha Algebra (Krishna Publications- Meerut)
2. Shanti Narayan A Text book of Modern Abstract algebra (Wiley Eastern)
3. Surjeet Singh & Zameeruddin Modern Algebra (Vikas Pub. House)
4. S. MacLane and G. Birkhoff Algebra 2nd ed. (Macmillan Co.)
5. D.S. Chauhan & K.N. Singh Studies in Algebra (JPH, Jaipur)

MAT 202 - Real Analysis

Unit-I

Riemann- Stieltjes integral, properties of Integral and Differentiation,

Unit II

Point wise and uniform convergence of sequence & series of functions, Cauchy criterion, Weirstrass M-test, Abel and Dirchlet test for Uniform Convergence, Uniform Convergence and continuity.

Unit-III

Measurable sets ,Lebesgue outer measure and measurability.

Unit IV

Measurable functions. Borel and Lebesgue measurability.Non measurable sets.

Unit-V

Convergence of sequence of measurable functions.Lebesgue integral of a bounded function.

References :

1. Malik- Arora Mathematical Analysis (New Age International Limited)
- 2-.H.L.Royden Real Analysis (Macmillen Pub. Co.)
3. Walter Rudin Real and Complex Analysis (TataMcgraw Hill)
4. G N.PurohitLebesgue measure & Integration (JPH. Jaipur)

MAT 203 - PARTIAL DIFFERENTIAL EQUATIONS

Unit-I

Existence and uniqueness of solution of $(dy/dx) = f(x,y)$. Examples of PDE. Classification. Canonical forms, Nonlinear First Order PDE-Complete Integrals, Envelopes,

Unit -II

Method of solving Second order PDE - separation of variable and Cauchy's problem.

Unit-III

Laplace's Equation, Heat Equation and Wave Equation upto three dimension in cartesian coordinates.

Unit - IV

Laplace's Equation, Heat Equation and Wave Equation in polar coordinates, their fundamental solutions by variable separation.

Unit V

Calculus of variations, Shortest distance, Minimum surface of revolution, Brachistochrone problem, Isoperimetric problem, Geodesic.

References :

1. Erwin Creyszig : Engineering Mathematics New Age India Ltd.
2. M.D. RaiSinghania : Advanced Differential Equation S.Chand Publication
3. Gold Stein : Classical Mechanics Narosa Publication
4. P.P. Gupta : Rigid Dynamics Krishna Prakashan Meerut.
5. M. Ray : Dynamics of Rigid Body Student's and Friend's Agra

MAT 204 - SPECIAL FUNCTION

Unit-I

The hypergeometric functions : The Gauss' hypergeometric function $F(a, c; z)$ its integral form, continuous function relations, the hypergeometric differential equation, elementary properties, simple and quadratic transformations, Gauss' and Kummer's theorems.

Unit – II

The generalised hypergeometric function $F(a_1, \dots, a_p, b_1, \dots, b_q; z)$, its differential equations, continuous function relations, integral forms, Saalschut's, Whipple's, Dixon's theorems, contour integral representation.

Unit- III

Bessel function : its differential equation, pure and differential recurrence relations, generating function, modified Bessel function and its properties.

Unit IV

Confluent hypergeometric function ${}_1F_1(a, b; z)$: definitions, properties, recurrence relations, Kummer's formulas.

Unit - V

Generating functions: generating functions of the form $G(2xt - t^2)$, sets generated by $e_t \cdot (xt)$ and $A(t) \exp[-xt / (1-t)]$ and the related theorems.

References:

1. Special functions by E.D. Rainville, Chelsea publishing company, Bronx, New York
2. Special functions by Y.L. Luke, Academic press, New York, London
3. Special functions by M.A. Pathan, P.K. Benarji, V.B.L. Chourasia and MC. Goyal, Ramesh Book Depot, Jaipur
4. Special functions by R.K. Saxena and D.C. Gokharoo, Jaipur Publishing House, m

MAT 205 - DISCRETE MATHEMATICS

Unit-I

Sets and Proposition: Cardinality. Mathematical Induction, Principle of inclusion and exclusion, Pigeon hole principle.

Unit II

Logic , Predicate , Validity of Statements , Quantification , Proof of Implications /Identities, Method of Proofs.

Unit III

Boolean Algebra : Boolean functions and expression, propositional calculus.
Design and Implementation of digital networks, Application to switching and Logic circuits.

Unit IV

Graph Theory : Graphs. planer graph. Eulerian and Hamiltonian Graph. Directed Graphs
Trees : Binary Tree, Binary Search Tree.

Unit-V

Lattices : Lattice and algebraic structure, duality, distributed and complemented lattice, partially ordered sets.

References

1. Schuam Series Discrete Mathematics (TataMcgraw Hill)
2. C.L.Liu Elements of Discrete Mathematics (Tata McGraw Hill)
3. Kenneth H Rosen Discrete Mathematics (TataMcgraw Hill)
4. M.k. Gupta Discrete Mathematics (Krishna Prakashan Meerut)

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M.Sc. MATHEMATICS



SYLLABUS

M.Sc. – IInd Year (III – SEMESTER)

compulsory Paper

MAT 301 - FUNCTIONAL ANALYSIS I

Unit - I

Metric spaces and their examples, Bounded and unbounded metric spaces , open sphere , closed ball, limit point, closure , interior , exterior and boundary of a set .

Unit II

Subspaces , product spaces , dense and non dense sets , separable spaces

Unit -III

Sequences and subsequences in a metric space , Cauchy's sequences , complete metric space , cantor's intersection theorem ,

Unit IV

Bair's category theorem , continuity in metric spaces , contracting mapping , fixed point theorem .

Unit - V

Normed linear spaces, Banach Spaces and their examples, subspaces and quotient spaces in Banach space

Book Recommended:

1. G.F. Simmons. Introduction to Topology and Modern Analysis, McGraw Hill Book Company Chapters 2, 9 and 10 (1963).
2. Ervin Kreyszig. Functional Analysis
3. J. N. Sharma. Functional Analysis (Krishna Prakashan)

Compulsory Paper

MAT 302 TOPOLOGY I

Unit -I

Countable and uncountable sets, Infinite sets and the Axiom of choice. Cardinal numbers and its arithmetic. Schroeder - Bernstein theorem. Cantor's theorem, Zorn's lemma. Well-ordering theorem.

Unit II

Definition and examples of topological spaces. Closed sets. Closure. Dense sets, Neighbourhoods, Interior, exterior, boundary and accumulation points, derived sets.

Unit -III

Bases and sub-bases. Subspaces and relative topology. First and second Countable spaces. Lindelof's theorems.

Unit IV

Separable spaces, Second Countability and Separability. Separation axioms T_0, T_1, T_2 and their Characterizations with basic properties. Urysohn's lemma. Tietze extension theorem.

Unit- V

Compactness, Continuous functions and compact sets. Basic properties of compactness. Compactness and finite intersection property, Sequentially and countably compact sets, Local compactness and one point compactification.

References :

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
2. George F. Simmons, Introduction to Topology and Modern Analysis McGraw Hill Book Company, 1983.
3. K.D. Joshi, Introduction to General Topology, Wiley Eastern Ltd.

M.Sc. Semester III- Optional Papers

Candidate has to opt three papers which are running in the University

Opt. Paper

MAT303 (i) - OPERATIONS RESEARCH I

Unit - I

Linear Programming : Two Phase Simplex method, Bounded variable problems.

Unit II

Duality, Dual Simplex methods.Sensitivity analysis.

Unit - III

Game Theory : Two person Zero sum game, Games with mixed Strategies, Solution of game theory by Linear programming.

Unit IV

Integer Programming.Revised simplex method.

Unit - V

Network Analysis : Shortest Path Problem, PERT and CPM

References :-

- 1.KantiSwaroop: Operations Research, S.Chand Publications
- 2.S.D.Sharma: Operations Research
3. V. K. Kapoor : Operations Research Sultan Chand and Sons
4. B.S. Goyal and S. K. Mittal: Operations Research PragatiPrakashan
5. Prem Kumar Gupta, D.S. Hira S. Chand and Co.

MAT 304 (ii) FLUID DYNAMICS I

Unit - I

Kinematics-Lagrangian methods.Equation of Continuity.Boundary surfaces. Stream lines, Path lines and streak lines, Velocity potential, Irrotational and rotational motion. Vortex Lines.

Unit II

Equations of Motion-Lagrange's and Euler's equations of motion, Bernouli's theorem, Equation of motion by flux method.

Unit - III

Equations referred to moving axes. Impulse reactions.Stream function, Irrotational motion in twodimensions.

Unit IV

Complex velocity potential.Sources, Sinks, Doublets and their images.Conformal mapping. Milne-Thomson circle theorem.

Unit - V

Two-dimensional Irrotational motion , motion of circular, co-axial and elliptic cylinders in an infinite mass of liquid, Kinetic energy of liquid, Theorem of Blasius,

References :

1. W.H.Besaint and A.S.Ramsey. Freatiseon Hydromechanics, Part II, CBS Publishers, Delhi 1988.
2. G.K. Batchelor and Introduction to Fluid Mechanics, Foundation, Books, New Delhi 1991.
3. F.Chortion, Textbook of fluid Dynamics, C.B.S, Publishers, Delhi 1985.
- 4.A.J.Chorin and A.Marsden, A Mathematicallntroduction to Fuild Dynamics, Springer-Vertag, New Yark 1993.
5. L.D.Landau and E.M. Lipschitz, Fluid mechanics, Pergamon Press, London, 1985.
6. M Ray : Hydrodynamics
7. M Ray : Fluid Dynamics
8. Shanti Swaroop Fluid Dynamics Krishna Prakashan

MAT 305(III) - PROGRAMMING IN C WITH ANSI FEATURES I

Unit - I

An overview of programming. Programming language, Classification. C Essentials-Program Development, Functions, Anatomy of a Function, Variables and Constants, Expressions.

Unit II

Assignment Statements. Formatting Source Files. Continuation Character. The preprocessor.

Unit - III

Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Type. The Void Data Type. Typedefs. Finding the Address of an object.

Unit IV

Pointers. Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loop.

Unit - V

Operators and Expressions-Precedence and Associativity, Unary Plus and Minus operators.

Binary

Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators.

Comma Operators.

References :

1. Peter A. Darnell and Phillip E. Margolis. C: A. Software Engineering Approach, Aarosa Publishing House (Singapore International Student Edition) 1993.
2. Samiel P. Harkison and Gly L. Steele Jr. C: A Reference manual 2nd Edition Prentice house 1984
3. Brian n. Kernighan & Dennis M. Ritchie. The C Programme Language, 2nd Edition ANSI 1989

M.Sc. MATHEMATICS



SYLLABUS

M.Sc. – IInd Year (IV – SEMESTER)

Compulsory papers

MAT 401 - FUNCTIONAL ANALYSIS II

Unit - I

Continuous linear transformations, Riesz lemma, Hahn-Banach theorem and its applications, Natural imbedding of N into N^{**} .

Unit II

The open mapping theorem, projections, the closed graph theorem, the uniform boundedness theorem.

Unit III

Inner product spaces, Hilbert spaces and their examples, Cauchy-Schwarz inequality, parallelogram law.

Unit IV

Orthogonal complements, Orthonormal sets, Projection theorem, Pythagorean theorem, Bessel's inequality, Gram-Schmidt orthogonalization process, Conjugate space H^* , Riesz representation theorem,

Unit V

The adjoint of an operator, self-adjoint, normal and unitary operators, perpendicular projections, invariance and reducibility, Orthogonal projections.

Book Recommended:

4. G.F. Simmons. Introduction to Topology and Modern Analysis, McGraw Hill Book Company Chapters 2, 9 and 10 (1963).
5. Ervin Kreyszig. Functional Analysis
6. J. N. Sharma. Functional Analysis (Krishna Prakashan)

Compulsory papers
MAT 402 -TOPOLOGY II

Unit I

Compactness in metric spaces. Equivalence of compactness, countable, and sequential compactness in metric spaces.

Unit - I

Connected spaces, Connectedness on the real line, Locally connected spaces. Tychonoff product topology in terms of standard sub-base and its characterizations, projection maps.

Unit III

Separation axioms and product spaces. Connectedness and product spaces. Compactness and product spaces (Tychonoff's theorem).

Unit - IV

Countability and product spaces, Embedding and metrization, Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem.

Unit V

Nets and filters. Topology and convergence of nets, Compactness and nets. Filters and their convergence.

References :

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
2. George F. Simmons, Introduction to Topology and Modern Analysis McGraw Hill Book Company, 1983.
3. K.D. Joshi, Introduction to General Topology, Wiley Eastern Ltd.

M.Sc. Semester IV- Optional Papers

Candidate has to opt three papers which are running in the University

Opt. Paper –

MAT 403 (i) - OPERATIONS RESEARCH II

Unit I

Dynamic Programming : Deterministic models, probabilistic models

Unit - II

Inventory problems and their analytical structures. Simple deterministic problems.

Unit III

Nonlinear Programming : One and multivariable unconstrained Optimization, K.T. Conditions for
Constrained Optimization. Sequencing

Unit - IV

Quadratic programming, Separable programming

Unit V

Queuing System : Steady state solution of queuing model : M/M/1, M/M/1 with limited waiting space, M /M/C, M/M/C with limited waiting space.

References :-

1. Kanti Swaroop: Operations Research, S.Chand Publications
2. S.D.Sharma: Operations Research
3. V. K. Kapoor : Operations Research Sultan Chand and Sons
4. B.S. Goyal and S. K. Mittal: Operations Research PragatiPrakashan
5. Prem Kumar Gupta, D.S. Hira S. Chand and Co.

Opt.Paper

MAT 404 (ii) FLUID DYNAMICS-II

Unit I

Motion of a sphere through a liquid at rest at infinity. Liquid streaming past a fixed sphere.
Equation of motion of a sphere, Stoke's stream function.

Vortex motion and its elementary properties, Kelvin's proof of permanence, Motions due to circular and rectilinear vortices.

Unit - II

Fluid Properties : General properties of Newtonian and Non-newtonian and plastic fluids Stress components in real fluid, Relations between rectangle components of stress. Relation between stresses and gradients of velocity,

Unit III

Navier-stoke equations of motion: Cartesian , Polar Cylindrical , Polar Spherical system of coordinates

Unit - IV

Plane Poiseuille and Couette flows between two parallel plates. Theory of Lubrication. Flow through tubes of uniform cross section in form of circle, annulus and equilateral triangle under constant pressure gradient, Unsteady flow over a flat plate.

Unit V

Reynolds number, Prandit's boundary layer. Boundary layer equations in two dimensions. Blasius solution, Boundary layer thickness. Displacement thickness. Karman Integral Conditions. Separation of boundary layer flow.

References :

1. W.H.Besaint and A.S.Ramsey. Freatiseon Hydromechanics, Part II, CBS Publishers, Delhi1988.
2. G.K. Batchelor and Introduction to Fluid Mechanics, Foundation, Books, New Delhi 1991.
3. F.Chortion, Textbook of fluid Dynamics, C.B.S, Publishers, Delhi 1985.
- 4.A.J.Chorin and A.Marsden, A MathemeticalIntrodution to Fuild Dynamics, Springer-Vertag,New Yark 1993.
5. L.D.Landau and E.M. Lipschitz, Fluid mechanics, Pergamon Press, London, 1985.

Opt. Paper – MAT 405 (iii)-PROGRAMMING IN C WITH ANSI FEATURES-II

Unit I

Relational Operators.Logical Operators.Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators.Conditional Operator.Memory Operator.

Unit - II

Arrays and Pointers-Declaring an Array. Arrays and Memory Initializing Arrays Encreption and Decryption.Pointer Arithmetic.Passing pointers as Fuction Arguments, Accessing Array. Elements through Pointers. Passing Arrays a Function Arguments. Sorting Algorithms.

Unit III

Strings.Multidimensional Arrays.Arrays of Pointers.Pointers to Pointers.Storage Classes-Fixed vs. Automatic Duration.Scope.Global variables.The register Specific. ANSI rules for the syntax and Semantics of the storage-class keywords. Dynamic Memory Allocation

Unit - IV

Structure and Union-Structures.Linked Lists, Union.Declarations.Functions-Passing Arguments. Declarations and Calls, Pointers to Functions.Recursion.The Main Function. Complex Declarations

Unit V

The C Preprocessor-Macro Substitution.Compilation. Include Facility line Control. Input and Output-Streams, Buffering. The <stdio.h> Header file. Error Handling. Opening and Closing a file.Reading and writing Data. Selecting an I/O Method, Unbuffered. I/O Random Access.The standard library for Input / Output.

References :

1. Peter A.Darnell and PhillipE.Margolis. C: A. Software Engineering Approach, Aarosa Publishing House (Singapur International Student Edition) 1993.
2. Samiel P. Harkison and Gly L. Steele Jr. C: A Reference manuai 2nd Edition Prentice house 1984
3. Brain n. Kernighan & Dennis M. Ritchie. The C Programme Language, 2nd Edition ANSI **1989**