

DEPARTMENT OF MATHEMATICS

SUBJECT- Integral Equation and Calculus of Variations

Name of Teacher- Dr. Poonam Yadav

CLASS- M.Sc.(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Linear Integral equations, Some basic identities, Initial value problems reduced to Volterra integral equations, Methods of successive substitution and successive approximation to solve Volterra integral equations of second kind	15/01/24 to 24/01/24	
Iterated kernels and Neumann series for Volterra equations, Resolvent kernel as a series, Laplace transform method for a difference kernel	25/01/24 to 03/02/24	
Solution of a Volterra integral equation of the first kind, Boundary value problems reduced to Fredholm integral equations	05/02/24 to 15/02/24	
Methods of successive approximation and successive substitution to solve Fredholm equations of second kind, Iterated kernels and Neumann series for Fredholm equations, Resolvent kernel as a sum of series	16/02/24 to 23/02/24	
Fredholm resolvent kernel as a ratio of two series, Fredholm equations with separable kernels, Approximation of a kernel by a separable kernel, Fredholm Alternative, Non homogeneous Fredholm equations with degenerate kernels.	26/02/24 to 07/03/24	
Green's function, Use of method of variation of parameters to construct the Green's function for a nonhomogeneous linear second order boundary value problem, Basic four properties of the Green's function	09/03/24 to 14/03/24	
TEST	15/03/24 & 16/03/23	
Alternate procedure for construction of the Green's function by using its basic four properties.	18/03/24 to 22/03/24	
Reduction of a boundary value problem to a Fredholm integral equation with kernel as Green's function, Hilbert-Schmidt theory for symmetric kernels.	01/04/24 to 08/04/24	
Motivating problems of calculus of variations, Shortest distance, Minimum surface of revolution, Brachistochrone problem	09/04/24 to 15/04/24	
Isoperimetric problem, Geodesics, Fundamental lemma of calculus of variations, Euler's equation for one dependant function	16/04/24 to 22/04/24	
generalization to 'n' dependant functions and to higher order derivatives, Conditional extremum under geometric constraints and under integral constraints	23/04/24 to 30/04/24	
Revision and Test	01/05/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- INNER PRODUCT SPACE

Name of Teacher- Dr. Raman

CLASS- M.Sc.(F)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Hilbert Spaces: Inner product spaces,	15/01/24 to 22/01/24	
Hilbert spaces, Schwarz's inequality, Hilbert space as normed linear space, Convex sets in Hilbert spaces, Projection theorem.	23/01/24 to 03/02/24	
Orthonormal sets, Separability, Total Orthonormal sets	05/02/24 to 15/02/24	
Bessel's inequality, Parseval's identity. Conjugate of a Hilbert space, Riesz representation theorem in Hilbert spaces	16/02/24 to 22/02/24	
Adjoint of an operator on a Hilbert space, Reflexivity of Hilbert space, Self-adjoint operators, Positive operators, Product of Positive Operators.	23/02/24 to 09/03/24	
Projection operators, Product of Projections	11/03/24 to 16/03/24	
Sum and Difference of Projections, Normal and unitary operators	18/03/24 to 22/03/24	
, Projections on Hilbert space, Spectral theorem on finite dimensional space	23/03/24 to 06/04/24	
Measure space, Generalized Fatou's lemma, Measure and outer measure, Extension of a measure, Caratheodory extension theorem.	08/04/24 to 15/04/24	
Signed measure, Hahn decomposition theorem, Jordan decomposition theorem, Mutually signed measure, Radon-Nikodym theorem, Lebesgue decomposition	16/04/24 to 23/04/24	
Lebesgue-Stieltjes integral, Product measures, Fubini's theorem, Baire sets, Baire measure, Continuous functions with compact support	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

Paper – Mathematical Analysis

Name of Teacher- Dr. Poonam Kumari

CLASS- M.Sc (P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Riemann-Stieltjes integral, Existence and properties, Integration and differentiation,	24/07/23 to 02/08/23	
The fundamental theorem of calculus, Integration of vector-valued functions, Rectifiable curves.	04/08/23 to 11/08/23	
Sequence and series of functions, Pointwise and uniform convergence, Cauchy criterion for uniform convergence	12/08/23 to 23/08/23	
M_n -test for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, Uniform convergence and continuity	24/08/23 to 06/09/23	
Uniform convergence and Integration, Uniform convergence and differentiation, Weierstrass approximation theorem.	07/09/23 to 19/09/23	
Power series, uniform convergence and uniqueness theorem, Abel's theorem, Tauber's theorem.	20/09/23 to 02/10/23	
Functions of several variables, Linear Transformations, Euclidean space R^n , Derivatives in an open subset of R^n	03/10/23 to 13/10/23	
Chain Rule, Partial derivatives, Continuously Differentiable Mapping, Young and Schwarz theorems.	14/10/23 to 26/10/23	
Taylor theorem, Higher order differentials, Explicit and implicit functions, Implicit function theorem	27/10/23 to 07/11/23	
Inverse function theorem, Change of variables, Extreme values of explicit functions, Stationary values of implicit functions	08/11/23 to 20/11/23	
Lagrange multipliers method, Jacobian and its properties.	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- MATHEMATICAL STATISTICS

Name of Teacher- Dr. Manisha Garg

CLASS- M.Sc.(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Probability: Definition and various approaches of probability, Addition theorem, Boole's in- equality	24/07/23 to 02/08/23	
Conditional probability and multiplication theorem, Independent events, Mutual and pairwise independence of events	04/08/23 to 11/08/23	
Bayes' theorem and its applications. Random variable and probability functions: Definition	12/08/23 to 23/08/23	
properties of random variables, Discrete and continuous random variables, Probability mass and density functions,	24/08/23 to 06/09/23	
Distribution function, Concepts of bivariate random variable: joint, marginal and conditional distributions.	07/09/23 to 19/09/23	
Mathematical expectation: Definition and its properties, Variance, Covariance, Moment generating function- Definitions and their properties.	20/09/23 to 02/10/23	
Discrete distributions: Uniform, Bernoulli, Binomial, Poisson and Geometric distributions with their properties.	03/10/23 to 13/10/23	
Continuous distributions: Uniform, Exponential and Normal distributions with their properties.	14/10/23 to 26/10/23	
Testing of hypothesis: Parameter and statistic, Sampling distribution and standard error of estimate, Null and alternative hypotheses, Simple and composite hypotheses,	27/10/23 to 07/11/23	
Critical region, Level of significance, One tailed and two tailed tests, Two types of errors.	08/11/23 to 20/11/23	
Tests of significance: Large sample tests for single mean, Single proportion, Difference between two means and two proportions.	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- MEASURE and INTEGRATION THEORY

Name of Teacher- Dr. Manisha Garg

CLASS- M.Sc.(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Set functions, Intuitive idea of measure, Elementary properties of measure, Measurable sets and their fundamental properties.	15/01/24 to 22/01/24	
Lebesgue measure of sets of real numbers, Algebra of measurable sets, Borel sets and their measurability,	23/01/24 to 03/02/24	
Equivalent formulation of measurable sets in terms of open, closed, F_* and G_* sets, Non-measurable sets.	05/02/24 to 15/02/24	
Measurable functions and their equivalent formulations, Properties of measurable functions, Approximation of a measurable function by a sequence of simple functions	16/02/24 to 22/02/24	
Measurable functions as nearly continuous functions, Egorov's theorem, Lusin's theorem,	23/02/24 to 09/03/24	
Convergence in measure and F. Riesz theorem for convergence in measure, Almost uniform convergence.	11/03/24 to 16/03/24	
Shortcomings of Riemann Integral, Lebesgue Integral of a bounded function over a set of finite measure and its properties	18/03/24 to 22/03/24	
Lebesgue integral as a generalization of Riemann integral, Bounded convergence theorem, Integral of non-negative functions, Fatou's Lemma	23/03/24 to 06/04/24	
Monotone convergence theorem, General Lebesgue Integral, Lebesgue convergence theorem. Vitali's covering lemma, Differentiation of monotonic functions, Functions of bounded variation representation and their representation as difference of monotonic functions	08/04/24 to 15/04/24	
Differentiation of indefinite integral, Fundamental theorem of calculus, Absolutely continuous functions and their properties	16/04/24 to 23/04/24	
Convex functions, Jensen's Inequality.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Number Theory & Trigonometry

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC\B.A. I

SESSION – 2023-24

TOPICS	DATE	REMARKS
Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithmetic.	15/01/24 to 22/01/24	
Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophantine equations in two variables	23/01/24 to 03/02/24	
Complete residue system and reduced residue system modulo m . Euler's ϕ function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem.	05/02/24 to 15/02/24	
Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function $[x]$.	16/02/24 to 22/02/24	
The number of divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $\sigma(n)$). Moebius function and Moebius inversion formula.	23/02/24 to 09/03/24	
De Moivre's Theorem and its Applications.	11/03/24 to 16/03/24	
Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties.	18/03/24 to 22/03/24	
Inverse circular and hyperbolic functions and their properties.	23/03/24 to 06/04/24	
Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.	08/04/24 to 15/04/24	
(The functions $d(n)$ and $\sigma(n)$). Moebius function and Moebius inversion formula.	16/04/24 to 23/04/24	
Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.	24/04/24 to 03/05/24	

DEPARTMENT OF MATHEMATICS

SUBJECT- Number Theory & Trigonometry

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC\B.A. I

SESSION – 2023-24

Revision and Test	04/05/24 to onwards	
-------------------	---------------------	--

DEPARTMENT OF MATHEMATICS

Paper – Operation Research

Name of Teacher- Dr. Poonam Kumari

CLASS- M.Sc.(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Operations Research: Origin, Definition and scope	15/01/24 to 22/01/24	
Linear Programming: Formulation and solution of linear programming problems by graphical and simplex methods	23/01/24 to 03/02/24	
Big-M and two-phase methods, Degeneracy, Duality in linear programming.	05/02/24 to 15/02/24	
Transportation Problems: Basic feasible solutions, Optimum solution by stepping stone and modified distribution methods	16/02/24 to 22/02/24	
Unbalanced and degenerate problems, Transshipment problem.	23/02/24 to 09/03/24	
Assignment problems: Solution by Hungarian method, Unbalanced problem, Case of maximization, Travelling salesman and crew assignment problems.	11/03/24 to 16/03/24	
Queuing models: Basic components of a queuing system, Concepts of stochastic processes, Poisson process, Birth-death process. Steady-state solution of Markovian queuing models with single and multiple servers (M/M/1, M/M/C, M/M/1/k, M/MC/k).	18/03/24 to 22/03/24	
Sequencing problems: Solution of sequencing problems, processing n jobs through 2 machines, n jobs through 3 machines, n jobs through m machines, 2 jobs through m machines.	23/03/24 to 06/04/24	
Inventory control models: Economic order quantity (EOQ) model with uniform demand and with different rates of demands in different cycles	08/04/24 to 15/04/24	
EOQ when shortages are allowed, EOQ with uniform replenishment, Inventory control with price breaks.	16/04/24 to 23/04/24	
Game Theory: Two person zero sum game, Game with saddle points, The rule of dominance, Algebraic, Graphical and linear programming methods for solving mixed	24/04/24 to 03/05/24	

strategy games.		
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Ordinary Differential Equation

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC\B.A. I

SESSION – 2023-24

TOPICS	DATE	REMARKS
Geometrical meaning of a differential equation. Exact differential equations, integrating factors.	15/01/24 to 22/01/24	
First order higher degree equations solvable for x,y,p Lagrange's equations, Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions.	23/01/24 to 03/02/24	
Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves..	05/02/24 to 15/02/24	
Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.	16/02/24 to 22/02/24	
Equations reducible to homogeneous linear ordinary differential equations.	23/02/24 to 09/03/24	
Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable.	11/03/24 to 16/03/24	
Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients.	18/03/24 to 22/03/24	
Ordinary simultaneous differential equations.	23/03/24 to 06/04/24	
Solution of simultaneous differential equations involving operators $x (d/dx)$ or $t (d/dt)$ etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$.	08/04/24 to 15/04/24	
differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact. General method of solving $Pdx + Qdy + Rdz = 0$ by taking one variable constant.	16/04/24 to 23/04/24	

Method of auxiliary equations.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Ordinary Differential Equation

Name of Teacher- Dr. Poonam Bai

CLASS- M.Sc(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Preliminaries, ϵ -approximate solution, Cauchy-Euler construction of an ϵ -approximate solution of an initial value problem, Equicontinuous family of functions, Ascoli-Arzelà Lemma, Cauchy-Peano existence	24/07/23 to 02/08/23	
Lipschitz condition, Picard-Lindelöf existence and uniqueness theorem for $y' = f(t, y)$, Solution	04/08/23 to 11/08/23	—
of initial-value problems by Picard's method, Dependence of solutions on initial conditions. (Relevant topics from the books by Coddington and Levinson, and Ross).	12/08/23 to 23/08/23	
Linear systems, Matrix method for homogeneous first order system of linear differential equations, Basic theory of the homogeneous linear system, Fundamental set of solutions, Fundamental matrix of solutions, Wronskian of solutions	24/08/23 to 06/09/23	
Abel-Liouville formula, Non-homogeneous linear system. Sturm Theory: Self-adjoint equations of the second order, Some basic results of Sturm theory.	07/09/23 to 19/09/23	
Abel's formula, Sturm Separation theorem, Sturm's Fundamental comparison theorem.	20/09/23 to 02/10/23	
Nonlinear differential systems, Phase plane, Path, Critical points, Autonomous systems, Isolated critical point, Path approaching a critical point, Path entering a critical point, Types of critical points - Center, Saddle points, Spiral points, Node points.	03/10/23 to 13/10/23	
. Stability of critical points, Stable critical points, Asymptotically stable critical points, Unstable critical points, Critical points and paths of linear systems.	14/10/23 to 26/10/23 3	
Definitions, examples and simple properties, Perfect numbers, Mobius inversion formula,	27/10/23 to	

	07/11/23	
Almost linear systems, Critical points and paths of almost linear systems, Nonlinear conservative dynamical systems, Dependence on a parameter, Liapunov's direct method. Limit Cycles and Periodic solutions:	08/11/23 to 20/11/23	
Limit cycles, Periodic solutions, Existence and nonexistence of limit cycles, Bendixson's nonexistence criterion, Poincare-Bendixson theorem (statement only), Index of a	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Real Analysis

Name of Teacher- Dr. Poonam Bai

CLASS - B.SC\B.A.III

SESSION – 2023-24

TOPICS	DATE	REMARKS
Riemann integral, Integrability of continuous and monotonic functions,	24/07/23 to 02/08/23	
The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.	04/08/23 to 11/08/23	
Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter.	12/08/23 to 23/08/23	
Continuity, Differentiability and integrability of an integral of a function of a parameter.	24/08/23 to 06/09/23	
Continuity, Differentiability and integrability of an integral of a function of a parameter.	07/09/23 to 19/09/23	
Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences,	20/09/23 to 02/10/23	
completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle	03/10/23 to 13/10/23	
Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness, Bolzano.	14/10/23 to 26/10/23	
Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness	27/10/23 to 07/11/23	
connectedness , components, continuity in relation with connectedness.	08/11/23 to 20/11/23	

Cantor's intersection theorem, Baire's category theorem, contraction Principle	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

Subject - Groups and Rings

Name of Teacher- Dr. Raman

CLASS- B.SC-I & BA I

SESSION – 2023-24

TOPICS	DATE	REMARKS
General equation of second degree. Tracing of conics	24/07/23 to 07/08/23	
Tangent at any point to the conic, chord of contact, pole of line to the conic, director circle of conic. System of conics.	08/08/23 to 17/08/23	
Confocal conics. Polar equation of a conic, tangent and normal to the conic.	18/08/23 to 26/08/23	
Sphere: Plane section of a sphere. Sphere through a given circle. Intersection of two spheres	28/08/23 to 08/09/23	
radical plane of two spheres. Co-oxal system of spheres	09/09/23 to 16/09/23	
Cones. Right circular cone, enveloping cone and reciprocal cone. Cylinder: Right circular cylinder and enveloping cylinder	18/09/23 to 27/09/23	
Central Conicoids: Equation of tangent plane. Director sphere	29/09/23 to 06/10/23	
Normal to the conicoids, Polar plane of a point. Enveloping cone of a conicoid, Enveloping cylinder of a coinoid	07/10/23 to 16/10/23	
Paraboloids: Circular section	17/10/23 to 27/10/23	
Plane sections of conicoids. Generating lines	30/10/23 to 08/11/23	
Confocal conicoid. Reduction of second degree equations.	09/11/23 to 18/11/23	
Revision and Test	20/11/23 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- SOLID GEOMETRY

Name of Teacher- Dr. Manisha Garg & Dr. Raman

CLASS- B.SC-I & B.A -I

SESSION – 2023-24

TOPICS	DATE	REMARKS
General equation of second degree. Tracing of conics.	24/07/23 to 02/08/23	
Tangent at any point to the conic, chord of contact, pole of line to the conic, director circle of conic. System of conics. Confocal conics.	04/08/23 to 11/08/23	
Polar equation of a conic, tangent and normal to the conic. Sphere:	12/08/23 to 23/08/23	
Plane section of a sphere. Sphere through a given circle. Intersection of two spheres	24/08/23 to 06/09/23	
radical plane of two spheres. Co-axial system of spheres Cones Right circular cone, enveloping cone and reciprocal cone	07/09/23 to 19/09/23	
Cylinder: Right circular cylinder and enveloping cylinder.	20/09/23 to 02/10/23	
Central Conicoids: Equation of tangent plane. Director sphere.	03/10/23 to 13/10/23	
Normal to the conicoids. Polar plane of a point.	14/10/23 to 26/10/23	
Enveloping cone of a conicoid. Enveloping cylinder of a conicoid.	27/10/23 to 07/11/23	
Paraboloids: Circular section, Plane sections of conicoids	08/11/23 to 20/11/23	
Generating lines. Confocal conicoid. Reduction of second degree equations	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- STATICS

Name of Teacher- Dr. Manisha Garg

CLASS- B.SC-II, B.A-II

SESSION – 2023-24

TOPICS	DATE	REMARKS
Composition and resolution of forces	24/07/23 to 02/08/23	
Parallel forces. Moments and Couples	04/08/23 to 11/08/23	
Analytical conditions of equilibrium of coplanar forces	12/08/23 to 23/08/23	
Friction	24/08/23 to 06/09/23	
Centre of Gravity.	07/09/23 to 19/09/23	
Virtual work.	20/09/23 to 02/10/23	
Forces in three dimensions.	03/10/23 to 13/10/23	
Poinsots central axis.	14/10/23 to 26/10/23	
Wrenches	27/10/23 to 07/11/23	
Null lines and planes.	08/11/23 to 20/11/23	
Stable and unstable equilibrium	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Programming in C and Numerical Method

Name of Teacher- Dr. Manisha Garg

CLASS- B.SC-2nd

SESSION – 2023-24

TOPICS	DATE	REMARKS
Programmer's model of a computer, Algorithms,	15/01/24 to 22/01/24	
Flow charts, Data types, Operators and expressions,	23/01/24 to 03/02/24	
Input / outputs functions , Decisions control structure	05/02/24 to 15/02/24	
Decision statements, Logical and conditional statements	16/02/24 to 22/02/24	
Implementation of Loops, Switch Statement & Case control structures. Functions, Preprocessors and Arrays.	23/02/24 to 09/03/24	
Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters. Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures.	11/03/24 to 16/03/24	
Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions. Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method	18/03/24 to 22/03/24	
Secant method, Newton-Raphson's method. Newton's iterative method for finding pth root of a number, Order of convergence of above methods.	23/03/24 to 06/04/24	
Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method	08/04/24 to 15/04/24	
Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition method.	16/04/24 to 23/04/24	
Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Sequence and Series

Name of Teacher- Dr. Manisha Garg

CLASS- B.SC-II (B), B.A-II

SESSION – 2023-24

TOPICS	DATE	REMARKS
Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points,	15/01/24 to 22/01/24	
limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano-Weierstrass theorem,	23/01/24 to 03/02/24	
Open covers, Compact sets and Heine-Borel Theorem. Sequence: Real Sequences and their convergence,	05/02/24 to 15/02/24	
Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits.	16/02/24 to 22/02/24	
Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series	23/02/24 to 09/03/24	
Convergence and divergence of geometric series, Hyper Harmonic series or p-series. Infinite series: D-Alembert's ratio test,	11/03/24 to 16/03/24	
Raabe's test, Logarithmic test, de Morgan and Bertrand's test,	18/03/24 to 22/03/24	
Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.	23/03/24 to 06/04/24	
Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: Abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis,	08/04/24 to 15/04/24	
re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem, Pringsheim's theorem (statement only),	16/04/24 to 23/04/24	
Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Special Function and Integral Transformation

Name of Teacher- Dr. Manisha Garg

CLASS- B.SC-II (B), B.A-II

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definitions Series solution of differential equations – Power series method, of Beta and Gamma functions.	15/01/24 to 22/01/24	
Bessel equation and its solution: Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions	23/01/24 to 03/02/24	
Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions	05/02/24 to 15/02/24	
Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials	16/02/24 to 22/02/24	
Laplace Integral Representation of Legendre polynomial. Laplace Transforms – Existence theorem for Laplace transforms,	23/02/24 to 09/03/24	
Laplace Transforms – Existence theorem for Laplace transforms,	11/03/24 to 16/03/24	
integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms,	18/03/24 to 22/03/24	
convolution theorem, Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform.	23/03/24 to 06/04/24	
Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem,	08/04/24 to 15/04/24	
Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms	16/04/24 to 23/04/24	
solution of differential Equations using Fourier Transforms.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Vector Calculus

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC\B.A. I

SESSION – 2023-24

TOPICS	DATE	REMARKS
Scalar and vector product of three vectors, product of four vectors.	15/01/24 to 22/01/24	
Reciprocal vectors. Vector differentiation. Scalar Valued point functions,	23/01/24 to 03/02/24	
vector valued point functions, derivative along a curve, directional derivatives.	05/02/24 to 15/02/24	
Gradient of a scalar point function, geometrical interpretation of grad Φ	16/02/24 to 22/02/24	
character of gradient as a point function. Divergence and curl of vector point function, characters of Div f and Curl f as point function, examples.	23/02/24 to 09/03/24	
Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator.	11/03/24 to 16/03/24	
Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors.	18/03/24 to 22/03/24	
Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates,	23/03/24 to 06/04/24	
Cylindrical co-ordinates and Spherical co-ordinates.	08/04/24 to 15/04/24	
Vector integration; Line integral, Surface integral, Volume integral.	16/04/24 to 23/04/24	
Theorems of Gauss, Green & Stokes and problems based on these theorms.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Special Function and Integral Transformation

Name of Teacher- Dr. Poonam Kumari

CLASS- B.SC-II (A)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definitions Series solution of differential equations – Power series method, of Beta and Gamma functions.	15/01/24 to 22/01/24	
Bessel equation and its solution: Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions	23/01/24 to 03/02/24	
Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions	05/02/24 to 15/02/24	
Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials	16/02/24 to 22/02/24	
Laplace Integral Representation of Legendre polynomial. Laplace Transforms – Existence theorem for Laplace transforms,	23/02/24 to 09/03/24	
Laplace Transforms – Existence theorem for Laplace transforms,	11/03/24 to 16/03/24	
integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms,	18/03/24 to 22/03/24	
convolution theorem, Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform.	23/03/24 to 06/04/24	
Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem,	08/04/24 to 15/04/24	
Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms	16/04/24 to 23/04/24	

solution of differential Equations using Fourier Transforms.	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Sequence and Series

Name of Teacher- Dr. Poonam Kumari

CLASS- B.SC-II (A)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points,	15/01/24 to 22/01/24	
limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano-Weiestrass theorem,	23/01/24 to 03/02/24	
Open covers, Compact sets and Heine-Borel Theorem. Sequence: Real Sequences and their convergence,	05/02/24 to 15/02/24	
Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits.	16/02/24 to 22/02/24	
Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series	23/02/24 to 09/03/24	
Convergence and divergence of geometric series, Hyper Harmonic series or p-series. Infinite series: D-Alembert's ratio test,	11/03/24 to 16/03/24	
Raabe's test, Logarithmic test, de Morgan and Bertrand's test,	18/03/24 to 22/03/24	
Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.	23/03/24 to 06/04/24	
Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis,	08/04/24 to 15/04/24	
re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem, Pringsheim's theorem (statement only),	16/04/24 to 23/04/24	
Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.	24/04/24 to 03/05/24	

Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

Subject – Abstract Algebra

Name of Teacher- Dr. Raman

CLASS- M.Sc. (Pre.)

SESSION – 2023-24

TOPICS	DATE	REMARKS
p-groups, Sylow p-subgroups, Sylow theorems, Applications of Sylow theorems	24/07/23 to 04/08/23	
Description of groups of order p^2 and pq , Survey of groups up to order 15.	05/08/23 to 11/08/23	
Normal and subnormal series, Solvable series, Derived series	12/08/23 to 22/08/23	
Solvable groups, Solvability of S_n -the symmetric group of degree n	23/08/23 to 31/08/23	
Central series, Nilpotent groups and their properties, Upper and lower central series	01/09/23 to 13/09/23	
Composition series, Zassenhaus lemma, Jordan-Holder theorem.	14/09/23 to 25/09/23	
Modules, Cyclic modules, Simple modules, Schur lemma, Free modules	26/09/23 to 09/10/23	
Torsion modules, Torsion free modules, Fundamental structure theorem for finitely generated free modules	10/10/23 to 26/10/23	
Modules over principal ideal domain and its applications to finitely generated abelian groups	27/10/23 to 04/11/23	
Unit Test	06/11/23 & 07/11/23	
Noetherian and Artinian modules, Noetherian and Artinian rings, Nil and nilpotent ideals in Noetherian and Artinian rings	08/11/23 to 17/11/23	
Hilbert basis theorem. $\text{Hom}_R(R,R)$, Opposite rings, Wedderburn-Artin theorem, Maschke theorem	18/11/23 to 23/11/23	
Revision and Test	25/11/23 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- Advanced Complex Analysis

Name of Teacher- Dr. Raman

CLASS- M.Sc.(F)

SESSION – 2023-24

Topics	Date	Remarks
Integral Functions, Factorization of an integral function, Weierstrass primary factors, Weierstrass factorization theorem	15/01/24 to 27/01/24	
Gamma function and its properties, Stirling formula, Integral version of gamma function, Riemann Zeta function	29/01/24 to 03/02/24	
Riemann functional equation, Mittag-Leffer theorem, Runge theorem (Statement only).	05/02/24 to 10/02/24	
Analytic Continuation, Natural Boundary, Uniqueness of direct analytic continuation, Uniqueness of analytic continuation along a curve	12/02/24 to 20/02/24	
Power series method of analytic continuation, Schwarz Reflection principle, Germ of an analytic function.	21/02/24 to 28/03/24	
Monodromy theorem and its consequences, Harmonic functions on a disk, Poisson kernel, The Dirichlet problem for a unit disc.	29/03/24 to 07/03/24	
Harnack inequality, Harnack theorem, Dirichlet region, Green function, Canonical product	09/03/24 to 18/03/23	
Jensen formula, Poisson-Jensen formula, Hadamard three circles theorem, Growth and order of an entire function	19/03/24 to 27/03/24	
An estimate of number of zeros, Exponent of convergence, Borel theorem, Hadamard factorization theorem	28/04/24 to 06/04/24	
Test	08/04/24 & 09/04/24	
The range of an analytic function, Bloch theorem, Schottky theorem, Little Picard theorem, Montel Caratheodory theorem	10/04/24 to 15/04/24	
Great Picard theorem, Univalent functions, Bieberbach conjecture (Statement only) and the $\frac{1}{4}$ theorem"	16/04/24 to 19/04/24	
Test and Revision	20/04/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

Paper- Advanced Calculus

Name of Teacher- Dr. Poonam Kumari

CLASS- B.SC-II, B.A-II

SESSION – 2023-24

TOPICS	DATE	REMARKS
Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems;	24/07/23 to 02/08/23	
Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders	04/08/23 to 11/08/23	
Darboux intermediate value theorem for derivatives, Indeterminate forms.	12/08/23 to 23/08/23	
Limit and continuity of real valued functions of two variables. Partial differentiation. Total Differentials; Composite functions & implicit functions. Change of variables	24/08/23 to 06/09/23	
Homogenous functions & Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables.	07/09/23 to 19/09/23	
Differentiability of real valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem.	20/09/23 to 02/10/23	
Maxima, Minima and saddle points of two variables.	03/10/23 to 13/10/23	
Lagrange's method of multipliers.	14/10/23 to 26/10/23	
Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae. Locus of the centre of curvature, Spherical curvature	27/10/23 to 07/11/23	
Locus of centre of Spherical curvature, Involutives, evolutes, Bertrand Curves.	08/11/23 to 20/11/23	
Surfaces: Tangent planes, one parameter family of surfaces, Envelopes	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

Paper- Algebra

Name of Teacher- Dr. Poonam Kumari, Dr. Poonam Bai

CLASS- B.SC-I, B.A-I

SESSION – 2023-24

TOPICS	DATE	REMARKS
Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operations on matrices. Rank of a matrices	24/07/23 to 02/08/23	
Inverse of a matrix. Linear dependence and independence of rows and columns of matrices.	04/08/23 to 11/08/23	
Row rank and column rank of a matrix. Eigenvalues, eigenvectors and the characteristic equation of a matrix.	12/08/23 to 23/08/23	
Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix.	24/08/23 to 06/09/23	
Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations.	07/09/23 to 19/09/23	
Theorems on consistency of a system of linear equations.	20/09/23 to 02/10/23	
Unitary and Orthogonal Matrices, Bilinear and Quadratic forms.	03/10/23 to 13/10/23	
Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots.	14/10/23 to 26/10/23	
Common roots and multiple roots. Transformation of equations.	27/10/23 to 07/11/23	
Nature of the roots of an equation Descarte's rule of signs.	08/11/23 to 20/11/23	
Solutions of cubic equations (Cardon's method). Biquadratic equations and their solutions.	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Algebra

Name of Teacher- Dr. Poonam Bai

CLASS - B.SC\B.A.I

SESSION – 2023-24

TOPICS	DATE	REMARKS
Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operations on matrices. Rank of a matrices. Inverse of a matrix.	24/07/23 to 02/08/23	
Linear dependence and independence of rows and columns of matrices. Row rank and column rank of a matrix.	04/08/23 to 11/08/23	
Eigenvalues, eigenvectors and the characteristic equation of a matrix. Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix.	12/08/23 to 23/08/23	
Applications of matrices to a system of linear (both homogeneous and non-homogeneous) equations.	24/08/23 to 06/09/23	
Theorems on consistency of a system of linear equations. Unitary and Orthogonal Matrices, Bilinear and Quadratic forms.	07/09/23 to 19/09/23	
Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots.	20/09/23 to 02/10/23	
Common roots and multiple roots. Transformation of equations.	03/10/23 to 13/10/23	
Nature of the roots of an equation Descarte's rule of signs.	14/10/23 to 26/10/233	
Solutions of cubic equations (Cardon's method).	27/10/23 to 07/11/23	
Biquadratic equations and their solutions.	08/11/23 to 20/11/23	
Eigenvalues, eigenvectors and the characteristic equation	21/11/23 to	

of a matrix	27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- Analytic Number Theory

Name of Teacher- Dr. Poonam Bai

CLASS- M.Sc (F)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Distribution of primes, Fermat and Mersenne numbers, Farey series and some results concerning Farey series,	24/07/23 to 02/08/23	
Approximation of irrational numbers by rationals, Hurwitz's theorem, Irrationality of e and π .	04/08/23 to 11/08/23	
The arithmetic in Z_n , The group U_n , Primitive roots and their existence, the group U_{p^n} (p -odd) and U_{2^n} , The group of quadratic residues Q_n ,	12/08/23 to 23/08/23	
Quadratic residues for prime power moduli and arbitrary moduli, The algebraic structure of U_n and Q_n .	24/08/23 to 06/09/23	
Riemann Zeta Function $\zeta(s)$ and its convergence, Application to prime numbers, $\zeta(s)$ as Euler product, Evaluation of $\zeta(2)$ and $\zeta(2k)$.	07/09/23 to 19/09/23	
Diophantine equations $ax+by=c$, $x^2+y^2=z^2$ and $x^4+y^4=z^4$, The representation of number by two or four squares,	20/09/23 to 02/10/23	
Waring problem, Four square theorem, The numbers $g(k)$ and $G(k)$, Lower bounds for $g(k)$ and $G(k)$.	03/10/23 to 13/10/23	
Arithmetic functions $\varphi(n)$, $\tau(n)$, $\sigma(n)$ and $\sigma_k(n)$, $U(n)$, $N(n)$, $l(n)$.	14/10/23 to 26/10/23	
Definitions, examples and simple properties, Perfect numbers, Mobius inversion formula,	27/10/23 to 07/11/23	
The Mobius function $\mu(n)$, The order and average order of the function $\varphi(n)$, $\tau(n)$ and $\sigma(n)$.	08/11/23 to 20/11/23	

The Mobius function $\mu(n)$,	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

Subject – Advanced Topology

Name of Teacher- Dr. Raman

CLASS- M.Sc.(Final)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Regular, Normal, T ₃ and T ₄ separation axioms, their characterization and basic properties	24/07/23 to 03/08/23	
Urysohn's lemma and Tietze extension theorem, Regularity and normality of a compact Hausdorff space	04/08/23 to 12/08/23	
Complete regularity, Complete normality, T _{3 1/2} and T ₅ spaces, their characterization and basic properties.	14/08/23 to 21/08/23	
Product topological spaces, Projection mappings, Tychonoff product topology in terms of standard subbases and its characterization	22/08/23 to 01/09/23	
Separation axioms and product spaces, Connectedness, Locally connectedness and compactness of product spaces, Product space as first axiom space, Tychonoff product theorem.	02/09/23 to 16/09/23	
Embedding and Metrization : Embedding lemma and Tychonoff embedding theorem, Metrizable spaces, Urysohn metrization theorem	18/09/23 to 25/09/23	
Nets : Nets in topological spaces, Convergence of nets, Hausdorffness and nets, Subnet and cluster points, Compactness and nets.	06/10/23 to 13/10/23	
Filters : Definition and examples, Collection of all filters on a set as a poset, Methods of generating filters and finer filters, Ultra filter and its characterizations	14/10/23 to 25/10/23	
Ultra filter principle, Image of filter under a function, Limit point and limit of a filter, Continuity in terms of convergence of filters, Hausdorffness and filters, Canonical way of converting nets to filters and vice versa, Stone-Cech compactification	26/10/23 to 07/11/23	
Unit Test	08/11/23 & 09/11/23	
Covering of a space, Local finiteness, Paracompact spaces, Michael's theorem on characterization of paracompactness,	10/11/23 to 16/11/23	
Paracompactness as regular as well as normal space, A. H. Stone theorem, Nagata- Smirnov Metrization theorem.	17/11/23 to 23/11/23	
Revision and Test	25/11/23 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- BUSINESS OF MATHEMATICS- II

Name of Teacher- Dr. Raman

CLASS- B.COM I (II SEM.)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definition of a Matrix ; Types of Matrices, Algebra of Matrices	15/01/24 to 22 /01/24	
Calculation of values of Determinants up to third order; adjoint of a Matrix, elementary row and column operations	23/01/24 to 31/02/24	
Finding inverse matrix through adjoint and elementary row or column operations	01/02/24 to 10/02/24	
Solution of a system of Linear equations having unique Solution and involving not more than three variables	12/02/24 to 23/02/24	
Differentiation (only algebraic problem),	26/02/24 to 07/03/24	
Application of differentiation	09/03/24 to 14/03/24	
TEST	15/03/24 & 16/03/23	
Compound Interest and Annuities ,Certain different types of interest rate	18/03/24 to 22/03/24	
Concept of present value and amount of a sum	01/04/24 to 08/04/24	
Types of annuities; Present value and amount of an annuity, including the case of continuous compounding	09/04/24 to 15/04/24	
Ratio, Proportion and Percentage	16/04/24 to 22/04/24	
Profit and Loss	23/04/24 to 30/04/24	
Revision and Test	01/05/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- Field Extension & Galois Theory

Name of Teacher- Dr. Poonam Bai

CLASS- M.SC (P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Fields, Prime fields, Finite field extensions,	15/01/24 to 22/01/24	
Degree of field extensions, Simple Extensions, Algebraic extensions, Splitting fields, Algebraically closed fields.	23/01/24 to 03/02/24	
Separable and inseparable extensions, Perfect fields.	05/02/24 to 15/02/24	
Monomorphisms and their linear independence, Automorphism of fields, Fixed fields, Normal extensions,	16/02/24 to 22/02/24	
The fundamental theorem of Galois theory.	23/02/24 to 09/03/24	
Finite fields, Existence of $GF(p^n)$, Construction of finite fields, Primitive elements	11/03/24 to 16/03/24	
Langrange's theorem on primitive elements, Roots of unity,	18/03/24 to 22/03/24	
Cyclotomic polynomials, Cyclotomic extensions of rational number field.	23/03/24 to 06/04/24	
Solutions by radicals, Extension by radicals,	08/04/24 to 15/04/24	
Generic polynomial, Insolvability of the general polynomial of degree $n \geq 5$ by radicals,	16/04/24 to 23/04/24	
Ruler and compasses constructio	24/04/24 to 03/05/24	
Revision and Test	04/05/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- FLUID DYNAMICS

Name of Teacher- Dr. Manisha Garg

CLASS- M.Sc (F)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Kinematics - Velocity at a point of a fluid. Eulerian and Lagrangian methods. Stream lines, path lines and streak lines. Velocity potential.	24/07/23 to 02/08/23	
Irrotational and rotational motions. Vorticity and circulation. Equation of continuity. Boundary surfaces.	04/08/23 to 11/08/23	
Acceleration at a point of a fluid. Components of acceleration in cylindrical and spherical polar co-ordinates.	12/08/23 to 23/08/23	
Pressure at a point of a moving fluid Euler equation of motion. Equations of motion in cylindrical	24/08/23 to 06/09/23	
spherical polar co-ordinates. Bernoulli equation. Impulsive motion.	07/09/23 to 19/09/23	
Kelvin circulation theorem. Vorticity equation. Energy equation for incompressible flow. Kinetic energy of irrotational flow. Kelvin minimum energy theorem	20/09/23 to 02/10/23	
Kinetic energy of infinite fluid. Uniqueness theorems. Axially symmetric flows. Liquid streaming past a fixed sphere.	03/10/23 to 13/10/23	
Motion of a sphere through a liquid at rest at infinity. Equation of motion of a sphere. Kinetic energy generated by impulsive motion. Motion of two concentric spheres.	14/10/23 to 26/10/23	
Three-dimensional sources, sinks and doublets. Images of sources, sinks and doublets in rigid impermeable infinite plane and in impermeable spherical surface.	27/10/23 to 07/11/23	
Two dimensional motion; Use of cylindrical polar co-ordinates. Stream function. Axisymmetric flow. Stoke stream function. Stoke stream function of basic flows.	08/11/23 to 20/11/23	
Irrotational motion in two-dimensions. Complex velocity potential. Milne-Thomson circle theorem. Two-dimensional sources, sinks, doublets and their images. Blasius theorem.	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

Subject - Groups and Rings

Name of Teacher- Dr. Raman

CLASS- B.SC-III (A)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups	24/07/23 to 02/08/23	
Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences	04/08/23 to 11/08/23	
Normal subgroups, Quotient groups	12/08/23 to 23/08/23	
Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups	24/08/23 to 06/09/23	
Permutations groups. Even and odd permutations. Alternating groups,	07/09/23 to 19/09/23	
Cayley's theorem, Centre of a group and derived group of a group.	20/09/23 to 02/10/23	
Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms,	03/10/23 to 13/10/23	
ideals (principal, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.	14/10/23 to 26/10/23	
Euclidean rings, Polynomial rings, Polynomials over the rational field,	27/10/23 to 07/11/23	
The Eisenstein's criterion, Polynomial rings over commutative rings	08/11/23 to 20/11/23	
Unique factorization domain, R unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

Paper- Groups and Rings

Name of Teacher- Dr. Poonam Kumari

CLASS- B.SC-III (B), B.A-III

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups	24/07/23 to 02/08/23	
Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences	04/08/23 to 11/08/23	
Normal subgroups, Quotient groups	12/08/23 to 23/08/23	
Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups	24/08/23 to 06/09/23	
Permutations groups. Even and odd permutations. Alternating groups,	07/09/23 to 19/09/23	
Cayley's theorem, Center of a group and derived group of a group.	20/09/23 to 02/10/23	
Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms,	03/10/23 to 13/10/23	
ideals (principal, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.	14/10/23 to 26/10/23	
Euclidean rings, Polynomial rings, Polynomials over the rational field,	27/10/23 to 07/11/23	
The Eisenstein's criterion, Polynomial rings over commutative rings	08/11/23 to 20/11/23	
Unique factorization domain, R unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$	21/11/23 to 27/11/23	
Revision and Test	28/11/23 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- General Topology

Name of Teacher- Dr. Raman

CLASS- M.Sc.(P)

SESSION – 2023-24

TOPICS	DATE	REMARKS
Definition and examples of topological spaces, Comparison of topologies on a set, Intersection and union of topologies on a set	15/01/24 to 24/01/24	
Limit point of a set, Derived set, Closed set, Closure of a set, Kuratowski closure axioms, Closure operator, Dense sets, Interior point and Interior of a set, Interior axioms, Exterior of a set	25/01/24 to 03/02/24	
Exterior axioms, Boundary of a set, Interior, exterior and boundary operators, Neighbourhoods, Alternative methods of defining a topology in terms of neighbourhood system and Kuratowski closure operator.	05/02/24 to 15/02/24	
Relative (Induced) topology, Base and subbase for a topology, Base for neighbourhood system. Continuous functions, Composition of continuous functions	16/02/24 to 23/02/24	
Pasting lemma, Open and closed functions, Homeomorphisms, Topological properties. Connectedness and its characterization	26/02/24 to 07/03/24	
connected subsets and their properties, Continuity and connectedness, Components, Locally connected spaces.	09/03/24 to 15/03/24	
Separation axioms: T_0 , T_1 , T_2 -spaces, their characterization and basic properties, T_2 -spaces and sequences. First countable, Second countable and Separable spaces	18/03/24 to 22/03/24	
Hereditary and topological property, Countability of a collection of disjoint open sets in separable and second countable spaces, Lindelof theorem.	01/04/24 to 08/04/24	
Compact spaces and subsets, Compactness in terms of finite intersection property, Continuity and compact Sets, Basic properties of compactness, Closedness of compact subset of a Hausdorff space	09/04/24 to 15/04/24	
Closedness of compact subset of a Hausdorff space, a continuous map from a compact space into a Hausdorff and its consequence	16/04/24 to 22/04/24	
Sequentially and Countably compact spaces, Locally compact spaces and One point compactification.	23/04/24 to 30/04/24	
Revision and Test	01/05/24 to onwards	

Signature