

## Lesson Plan

Subject: Mathematics

Paper: BM -351 : REAL ANALYSIS

Class: B.A-III(Fifth Semester)

Session: 2023-2024

Teacher's Name: Ms. Supriya Chopra

Sr. No.	Months	Topics to be covered
1	July	Riemann integral, Integrability of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.
2	August	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter.
3	September	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, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle
4	October	Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness, connectedness, components, continuity in relation with connectedness.

Signature

## Lesson Plan

Subject: Mathematics

Paper: BM -352 : Group and Rings

Class: B.A-III(Fifth Semester)

Session: 2023-2024

Teacher's Name: Ms. Supriya Chopra

Sr. No.	Months	Topics to be covered
1	July	Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences, Normal subgroups, Quotient groups,
2	August	Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group.
3	September	Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principal, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.
4	October	Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, Polynomial rings over commutative rings, Unique factorization domain, $R$ unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$

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## Lesson Plan

Subject: Mathematics

Paper: BM -352 : Numerical Analysis

Class: B.A-III(Fifth Semester)

Session: 2023-2024

Teacher's Name: Ms. Supriya Chopra

Sr. No.	Months	Topics to be covered
1	July	Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values, Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae. Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula
2	August	Central Differences: Gauss forward and Gauss's backward interpolation formulae, Sterling, Bessel Formula. Probability distribution of random variables, Binomial distribution, Poisson's distribution, Normal distribution: Mean, Variance and Fitting.
3	September	Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II. Eigen Value Problems: Power method, Jacobi's method, Given's method, Householder's method, QR method, Lanczos method.
4	October	Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one- third and three-eighth rule, Chebychev formula, Gauss Quadrature formula. Numerical solution of ordinary differential equations: Single step methods – Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods. Multiple step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

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