# GOVT. COLLEGE FOR JATUSANA (REWARI)
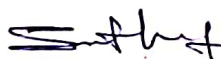
### Lesson Plan (Session 2024-25)

Assistant Professor: Mr Sumit Kumar          Class:-B.A. -III Year (5$^{th}$ Sem)

Subject: Mathematics (Groups and Rings)

| July | |
|---|---|
| Week 3 | Definition of a group with example and simple properties of groups |
| Week 4 | Subgroups and Subgroup criteria |
| **August** | |
| Week 1 | Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition |
| Week 2 | Largrage's theorem and its consequences, Normal subgroups, Quotient groups |
| Week 3 | Homoomorphisms, isomophisms, automorphisms and inner automorphisms of a group |
| Week 4 | Automorphisms of cyclic groups, Permutations groups |
| **September** | |
| Week 1 | Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group |
| Week 2 | Introduction-to rings, subrings, integral domains and fields |
| Week 3 | Characteristics of a ring |
| Week 4 | Ring homomorphisms, ideals (principle, prime and Maximal) |
| **October** | |
| Week 1 | Quotient rings, Field of quotients of an integral domain |
| Week 2 | Euclidean rings, Polynomial rings, Polynomials over the rational field |
| Week 3 | The Eisenstein's criterion, Polynomial rings over commutative rings |
| Week 4 | Unique factorization domain |
| **November** | |
| Week 1 | R unique factorization domain implies so is $R[X1, X2, \ldots\ldots Xn]$ |
| Week 2 | Revision |
| Week 3 | Revision |
| Week 4 | Revision |

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## Lesson Plan (Session 2024-25)

**Assistant Professor: Mr Sumit Kumar**         **Class:- B.A. -III Year (5th Sem)**

Subject: Mathematics (Numerical Analysis)

| July | |
|---|---|
| Week 3 | Finite Differences operators and their relations |
| Week 4 | 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 |
| **August** | |
| Week 1 | Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula |
| Week 2 | Central Differences: Gauss forward and Gauss's backward interpolation formulae |
| Week 3 | Sterling, Bessel Formula |
| Week 4 | Sterling, Bessel Formula |
| **September** | |
| Week 1 | Probability distribution of random variables |
| Week 2 | Binomial distribution, Poisson's distribution |
| Week 3 | Normal distribution: Mean, Variance and Fitting |
| Week 4 | Numerical Differentiation: Derivative of a function using interpolation formulae Newton's forward and Newton's backward |
| **October** | |
| Week 1 | Numerical Differentiation: Derivative of a function using interpolation formulae Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula |
| Week 2 | Numerical Differentiation: Derivative of a function using interpolation formulae Central Differences: Gauss forward, Gauss's backward, Sterling, Bessel Formula |
| Week 3 | Eigen Value Problems: Power method, Jacobi's method, Given's method |
| Week 4 | House- Holder's method, QR method, Lanczos method |
| **November** | |
| Week 1 | Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eighth rule, Chebychev formula, Gauss Quadrature formula |
| Week 2 | Numerical solution of ordinary differential equations: Single step methods- Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods |
| Week 3 | Multiple-step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method |
| Week 4 | Revision |

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## Lesson Plan (Session 2024-25)

**Assistant Professor: Mr Sumit Kumar**          **Class:-B.A. -III Year (5ᵗʰ Sem)**

**Subject: Mathematics (Real Analysis)**

| July | |
|---|---|
| Week 3 | Riemann integral |
| Week 4 | Integrability of continuous and monotonic functions, The Fundamental theorem of integral calculus. |
| **August** | |
| Week 1 | Mean value theorems of integral calculus |
| Week 2 | Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests |
| Week 3 | Frullani's integral, Integral as a function of a parameter |
| Week 4 | Continuity, Differentiability and integrability of an integral of a function of a parameter |
| **September** | |
| Week 1 | Continuity, Differentiability and integrability of an integral of a function of a parameter |
| Week 2 | Definition and examples of metric spaces, neighborhoods, limit points |
| Week 3 | Interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space |
| Week 4 | Equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem |
| **October** | |
| Week 1 | Baire's category theorem, contraction Principle |
| Week 2 | Continuous functions, uniform continuity, compactness for metric spaces |
| Week 3 | Sequential compactness, Bolzano-Weierstrass property |
| Week 4 | Total boundedness, finite intersection property, continuity in relation with compactness, connectedness |
| **November** | |
| Week 1 | Continuity in relation with connectedness. |
| Week 2 | Revision |
| Week 3 | Revision |
| Week 4 | Revision |

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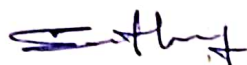Jatusana

# GOVT. COLLEGE FOR JATUSANA (REWARI)

## Lesson Plan (Session 2024-25)

Assistant Professor: Mr Sumit Kumar                    Class:-B.A. -I Year (1st Sem)

Subject: Mathematics (Major)

| July | |
|---|---|
| Week 3 | Successive differentiation |
| Week 4 | ε-δ definition of limit and continuity of a real-valued function, Basic properties of limits, Types of discontinuities |
| **August** | |
| Week 1 | Differentiability of functions, Application of L'Hospital rule to indeterminate forms |
| Week 2 | Leibnitz theorem, Taylor's, and Maclaurin's series expansion with different forms of remainder |
| Week 3 | Asymptotes: Horizontal, vertical, and oblique asymptotes for algebraic curves |
| Week 4 | Asymptotes for polar curves, Intersection of a curve and its asymptotes |
| **September** | |
| Week 1 | Curvature and radius of curvature of curves (cartesian, parametric, polar & intrinsic forms) |
| Week 2 | Newton's method, Centre of curvature, and circle of curvature |
| Week 3 | Multiple points, Node, Cusp, Conjugate point |
| Week 4 | Tracing of curves, Reduction formulae |
| **October** | |
| Week 1 | Rectification, intrinsic equation of a curve |
| Week 2 | Quadrature, Area bounded by closed curves |
| Week 3 | Volumes and surfaces of solids of revolution |
| Week 4 | Volumes and surfaces of solids of revolution |
| **November** | |
| Week 1 | Revision |
| Week 2 | Revision |
| Week 3 | Revision |
| Week 4 | Revision |

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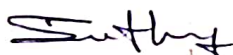Jatusana

# GOVT. COLLEGE FOR JATUSANA (REWARI)

## Lesson Plan (Session 2024-25)

Assistant Professor: Mr Sumit Kumar        Class:-B.A. -I Year (1st Sem)

Subject: Business Mathematics (Minor)

| | |
|---|---|
| **July** | |
| Week 3 | Set Theory: Representation of sets, equivalent sets, power set, complement of a set. |
| Week 4 | Venn Diagrams: Union and intersection of sets, De-Morgan's laws |
| **August** | |
| Week 1 | Logical statements and truth tables |
| Week 2 | Logarithms: Laws of operation, log tables |
| Week 3 | Arithmetic and geometric progression |
| Week 4 | Matrices and Determinants: Definition of a matrix, order, equality, types of matrices |
| **September** | |
| Week 1 | Operations on matrices: Addition, multiplication and multiplication with a scalar and their simple properties |
| Week 2 | Determinant of a square matrix (upto 3x 3 order): Properties of determinants, minors, co-factors and applications of determinants in finding the area of triangle |
| Week 3 | Adjoint and inverse of a square matrix, solutions of a system of linear equations by examples |
| Week 4 | Compound interest and annuities: Different types of interest rates |
| **October** | |
| Week 1 | types of annuities, present value and amount of an annuity (including the case of continuous compounding) |
| Week 2 | valuation of simple loans and debentures, problems related to sinking funds |
| Week 3 | Revision |
| Week 4 | Revision |
| **November** | |
| Week 1 | Revision |
| Week 2 | Revision |
| Week 3 | Revision |
| Week 4 | Revision |

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