**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: B. Sc (N.M) 3rd Year, Sem-V

Name of the Subject -:Numerical Analysis

| Month | Topic |
| --- | --- |
| July to August | 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 |
| August to September | 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. |
| September to October | 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, House-Holder’s method, QR method, Lanczos method. |
| October to November | 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 |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: B. Sc (N.M) 3rd Year, Sem-V

Name of the Subject -:Groups and Rings

| Month | Topic |
| --- | --- |
| July to August | 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, Largrage’s theorem and its consequences, Normal subgroups, Quotient groups |
| August to September | Homoomorphisms, isomophisms, 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. |
| September to October | Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principle, prime and Maximal) and Quotient rings, Field of quotients of an integral domain. |
| October to November | 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[X1 , X2……Xn] |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: B. Sc (N.M) 3rd Year, Sem-V

Name of the Subject -: Real Analysis

| Month | Topic |
| --- | --- |
| July to August | Riemann integral, Integrabililty of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus. |
| August to September | 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. |
| September to October | 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 |
| October to November | 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 2025-26**

Teacher Name-: Ms. Vandana Kumari

Name of the Class -: B.A., [B.Com](http://b.com) and [B.Sc](http://b.sc) wih major in Physics 1st Year, Sem-I

Name of the Subject -: Basic Mathematics (Minor)

| Month | Topic |
| --- | --- |
| July to August | Calculus: (Problems and theorems involving trigonometrically ratios are not to be done). Differentiation: Partial derivatives up to second order; Homogeneity of functions and Euler’s theorem; total differentials, Differentiation of implicit function with the help of total differentials. Maxima and Minima; Cases of one variable involving second or higher order derivatives; Cases of two variables involving not more than one constraint. |
| August to September | Integration: Integration as anti-derivative process; Standard forms; Methods of integration by substitution, by parts, and by use of partial fractions; Definite integration; Finding areas in simple cases; Consumers and producers surplus; Nature of Commodities learning Curve; Leontiff Input-Output Model. |
| September to October | Matrices: Definition of matrix; Types of matrices; Algebra of matrices. |
| October to November | Determinants: Properties of determinants; calculation of values of determinants up to third order; Adjoint of a matrix, through Adjoint and elementary row or column operations; Solution of system of linear equations having unique solution and involving not more than three variables. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: B. Sc Physical Science 2nd Year, Sem -III

Name of the Subject -: Ordinary Differential Equations (DSC)

| Month | Topic |
| --- | --- |
| July to August | Geometrical meaning of a differential equation. Exact differential equations. Integrating factors. First order higher degree equations solvable for x,y,p. Lagrange’s equations, Clairaut’s equations. Equation reducible to Clairaut’s form. Singular solutions. |
| August to September | Orthogonal trajectories: Cartesian coordinates and polar coordinates. Self-orthogonal family of curves. Linear ordinary differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous. |
| September to October | Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/the independent variable. 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. |
| October to November | Ordinary simultaneous differential equations. 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. Total differential equations. Condition for Pdx + Qdy +Rdz = 0 to be exact. General method of solving Pdx + Qdy + Rdz = 0 by taking one variable constant. Method of auxiliary equations |

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**Lesson Plan 2025-26**

Teacher Name-: Ms Vandana Kumari

Name of the Class -: [B. Sc](http://b.sc) Physical Science 1st Year, Sem -I

Name of the Subject -: Mathematical Programming in C and Numerical Methods (SEC)

| Month | Topic |
| --- | --- |
| July to August | Programmer’s model of a computer, Algorithms, Flow charts, Data types, Operators and expressions, Input / Output functions. Decisions control structure: Decision statements, Logical and conditional statements, Implementation of Loops, Switch Statement & Case control structures. Functions, Preprocessors and Arrays. |
| August to September | 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. Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions. |
| September to October | Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson’s method. Newton’s iterative method for finding pth root of a number, Order of convergence of above methods. |
| October to November | Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). Crout’s method, Cholesky Decomposition method. Iterative method, Jacobi’s method, Gauss-Seidal’s method, Relaxation method. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: [B.Sc](http://b.sc) Physical Science 1st Year, Sem -I

Name of the Subject -: Functions and Algebra (DSC)

| Month | Topic |
| --- | --- |
| July to August | Relations, Functions along with domain and range, Composition of functions, Invertibility and inverse of functions, One-to-one correspondence and the cardinality of a set. |
| August to September | Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots. Common roots and multiple roots. Transformation of equations. Nature of the roots of an equation Descarte’s rule of signs. Solutions of cubic equations (Cardon’s method). Biquadratic equations and their solutions. |
| September to October | Matrix and its types: Symmetric, Skew-symmetric, Hermitian and Skew Hermitian matrices. Unitary and Orthogonal Matrices, Idempotent, Involuntary, Nilpotent Matrices. Rank of a Matrix & its applications: Rank of a matrices, Row rank and column rank of a matrix, Elementary Operations on matrices, Inverse of a matrix , Normal Form, PAQ Form, Linear dependence and independence of rows and columns of matrices , Applications of matrices to a system of linear (both homogeneous and non– homogeneous) equations, Theorems on consistency of a system of linear equations. |
| October to November | Cayley Hamilton theorem. 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. Diagonalization of matrix. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Dr. Hariom

Name of the Class -: B.A., [B.Com](http://b.com) and [B.Sc](http://b.sc) wih major in Physics 1st year, Sem -I

Name of the Subject -: Introductory Mathematics (MDC)

| Month | Topic |
| --- | --- |
| July to August | Numbers, H.C.F. and L.C.M. of Numbers, Decimal and Fractions, Simplification, Square roots and cube roots, Surds and indices. |
| August to September | Problems on numbers, Average, Percentage, Profit and Loss, Ratio and proportion. |
| September to October | Problem on ages, Partnership, Time and work, Time and distance. |
| October to November | Problems on trains, Mixture problem, Problems based on Calendar and clock. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Dr. Hariom

Name of the Class -: B.A., and BBA 2nd Year, Sem -III

Name of the Subject -: Applicable Mathematics (MDC)

| Month | Topic |
| --- | --- |
| July to August | Theory of Sets: Meaning, elements, types, presentation and equality of Sets, Union, Intersection, Complement and Difference of Sets, Venn Diagram, Cartesian Product of two Sets, Applications of Set Theory. |
| August to September | Matrices and Determinants: Definition of a Matrix ; Types of Matrices, Algebra of Matrices; Properties of determinants; Calculation of values of Determinants upto third order; adjoint of a Matrix, elementary row and column operations; Finding inverse matrix through adjoint; Solution of a system of Linear equations having unique Solution and involving not more than three variables. |
| September to October | Compound Interest: Certain different types of interest rate; Concept of present value and amount of a sum. |
| October to November | Annuities: Types of annuities; Present value and amount of an annuity, including the case of continuous compounding. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Ms. Vandana Kumari and Dr. Hariom

Name of the Class -: [B.Com](http://b.com) and [B.Sc](http://b.sc) wih major in Physics 2nd Year, Sem -III

Name of the Subject -: Operations Reasearch (Minor)

| Month | Topic |
| --- | --- |
| July to August | Linear programming problems (LPP): Introduction to linear programming problems (LPP), Mathematical formulation of the linear programming problems with illustrations. Graphical method used for solving linear programming problem. Feasible region of LPP, unbounded solution to the LPP in graphical method, Canonical and standard form of LPP. |
| August to September | Simplex Method: Basic and non basic variables, Theory of Simplex method, optimality and unboundlessness, Simplex algorithm, Simplex method in tableau format. Introduction to artificial variables, Two –phase simplex method, Big-M method, Degeneracy problem in simplex method. |
| September to October | Transportation Problem: Introduction to transportation problem, Initial basic feasible solution to transportation problem using North-West Corner, Least Cost Method and Vogel's approximation Method. Optimal solution to transportation problem using MODI method, Unbalanced transportation problem, Degeneracy in transportation problem. |
| October to November | Assignment Problem: Introduction to assignment problem, Mathematical formulation of assignment problem, Solution to assignment problem using Hungarian method. |

Signature..............

**Lesson Plan 2025-26**

Teacher Name-: Dr. Hariom

Name of the Class -: B. Sc Physical Science, Sem -III

Name of the Subject -: Operations Research Techniques (SEC)

| Month | Topic |
| --- | --- |
| July to August | Definition, scope, methodology and applications of OR. Types of OR models. Concept of optimization, Linear Programming: Introduction, Formulation of a Linear Programming Problem  (LPP), Requirements for an LPP, Advantages and limitations of LP. Graphical solution: Multiple, unbounded and infeasible solutions. |
| August to September | Principle of simplex method: standard form, basic solution, basic feasible solution. Computational Aspect of Simplex Method: Cases of unique feasible solution, no feasible solution, multiple solution and unbounded solution and degeneracy. Two Phase and Big- M methods. |
| September to October | Duality in LPP, primal-dual relationship. Transportation Problem: Methods for finding basic feasible solution of a transportation problem, Modified distribution method for finding the optimum solution, Unbalanced and degenerate transportation problems, transhipment problem, maximization in a transportation problem. |
| October to November | Assignment Problem: Solution by Hungarian method, Unbalanced assignment problem, maximization in an assignment problem, Crew assignment and Travelling salesman problem.  Game Theory: Two person zero sum game, Game with saddle points, the rule of dominance; Algebraic, graphical and linear programming methods for solving mixed strategy games. |

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