

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: DR. VANDANA GUPTA****CLASS: B.A/B.Sc. I****SEMESTER: I****PAPER: INTRODUCTORY MATHEMATICS****COURSE CODE: B23-MAT-104****CREDITS: 2****SESSION:2026-27**

Month	Topics	Academic Activity
AUGUST	Sets and their representations, Empty set, Finite and infinite sets, Subsets, Equal sets, Power sets, Universal set, Union and intersection of sets, Difference of two sets, Complement of a set, Venn diagram, De-Morgan's laws and their applications. An introduction to matrices and their types, Operations on matrices, Symmetric and skew-symmetric matrices, Minors, Co-factors. Determinant of a square matrix, Adjoint and inverse of a square matrix, Solutions of a system of linear equations up to order 3.	Assignment 1
SEPTEMBER	Complex numbers, Operations on complex numbers, Modulus and argument of a complex number. Linear inequalities, Algebraic solutions of linear inequalities in two variables and their graphical representation. Quadratic equations, Solution of quadratic equations.	Assignment 2
OCTOBER	Arithmetic progression, Geometric progression, Harmonic progression, Arithmetic mean (A.M.), Geometric mean (G.M.), Harmonic mean (H.M.), Relation between A.M., G.M. and H.M.	Mid term exam
NOVEMBER	Straight lines: Slope of a line and angle between two lines, Different forms of equation of a line: Parallel to co-ordinate axes, Point-slope form, Slope-intercept form, Two-point form, General form; Distance of a point from a straight line. Standard form of a circle and its properties.	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: Dr. VANDANA GUPTA****CLASS: B.A./B.Sc. I****SEMESTER: II****COURSE CODE: B23-MAT-204****PAPER: MATHEMATICS FOR COMMERCE AND SOCIAL SCIENCES****CREDITS: 2****SESSION:2026-27**

Month	Topics	Academic Activity
AUGUST	Matrices and Determinants: Definition of a matrix, Order, Equality, Types of matrices, Operations on matrices: addition, multiplication and multiplication with a scalar and their simple properties. Minors, Co-factors, Determinant, Properties of determinants and applications of determinants in finding the area of a triangle, Adjoint and inverse of a square matrix, Solutions of simultaneous linear equations.	Assignment
SEPTEMBER	Differentiation, Derivatives of simple functions and other functions having applications in business and social studies, Maxima and minima of a function and their applications to Revenue, Cost, Demand, Production, Profit functions and other functions related to commercial and social Problems. Integration of simple functions and its applications in commercial and economic problems.	Assignment 2
OCTOBER	Simple interest and compound interest. Annuities: Types of annuities, Present value and amount of an annuity (including the case of continuous compounding), Valuation of simple loans and debentures, Problems related to sinking funds.	Midterm exam
NOVEMBER	Linear Programming: Formulation of linear programming problems (LPP) and their solution by graphical and Simplex methods. Applications of linear programming in solving social science and business problems.	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA

LESSON PLAN

NAME OF TEACHER: Dr. VANDANA GUPTA

CLASS: B.A./B.Sc./B. Com I

SEMESTER: II

COURSE CODE: B23-SEC-225

PAPER: NUMERICAL ABILITY ENHANCEMENT SKILLS

CREDITS: 2

SESSION:2026-27

Month	Topics	Academic Activity
AUGUST	Real number system, Operations on numbers, Tests for divisibility of natural numbers, Decimals, Fractions, Square roots, Cube roots, Surds and indices, Use of BODMAS.	Assignment 1 to be taken
SEPTEMBER	HCF, LCM of integers, Ratio and Proportion, Progressions: Arithmetic Progression, Geometric Progression, Harmonic Progression with their simple and basic practical applications, Number series completion.	Assignment 2 and Midterm exam to be taken
OCTOBER	Percentage, Profit & Loss, Alligation or mixture, Average, Average speed problems, Calendar.	Class test
NOVEMBER	Logarithms, Area of Quadrilaterals (Parallelogram, Square, Rectangle, Rhombus, Trapezium), Volume and surface area of Cube, Cuboid, Cylinder, Cone, Sphere and Hemisphere.	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: Dr. VANDANA GUPTA****CLASS: B.A/B.Sc. II****SEMESTER: III****PAPER: DIFFERENTIAL EQUATIONS -I****COURSE CODE: B23-MAT-301****CREDITS: 3****SESSION:2026-27**

Month	Topic	Academic Activity
AUGUST	Basic concepts and genesis of ordinary differential equations, Order and degree of a differential equation, Solutions of differential equations of first order and first degree, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p, Lagrange's equations, Clairaut's form and singular solutions. Orthogonal trajectories of one-parameter families of curves in a plane.	Assignment 1 to be taken
SEPTEMBER	Solutions of linear ordinary differential equations with constant coefficients, linear non-homogeneous differential equations. Linear differential equation of second order with variable coefficients. Method of reduction of order, method of undetermined coefficients, method of variation of parameters. Cauchy-Euler equation.	Assignment 2
OCTOBER	Solution of simultaneous differential equations, total differential equations. Genesis of Partial differential equations (PDE), Concept of linear and nonlinear PDEs. Complete solution, general solution and singular solution of a PDE. Linear PDE of first order. Lagrange's method for PDEs of the form: $P(x, y, z) p + Q(x, y, z) q = R(x, y, z)$, where $p = \partial z / \partial x$ and $q = \partial z / \partial y$.	Mid-term exam
NOVEMBER	Integral surfaces passing through a given curve. Surfaces orthogonal to a given system of surfaces. Compatible systems of first order equations. Charpit's method, Special types of first order PDEs, Jacobi's method. 2nd Order Partial Differential Eqs.	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA

LESSON PLAN

NAME OF TEACHER: Dr. VANDANA GUPTA

CLASS: B.A./B.Sc./B. Com II

SEMESTER: III

PAPER: REASONING

CREDITS: 2

COURSE CODE: B23-SEC-327

SESSION:2026-27

Month	Topics	Academic Activity
AUGUST	Series Completion, Wrong letter and wrong number series, Analogy	Assignment 1 to be taken
SEPTEMBER	Coding and decoding, Place arrangement, Direction sense test, Blood relation, Family based puzzles	Assignment 2 and Midterm exam to be taken
OCTOBER	Arithmetic reasoning, Venn diagrams, Logical Venn Diagrams, Symbol Substitution	Class test
NOVEMBER	Choosing the odd figure, Analytical Reasoning, Water images, Mirror images	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: DR. VANDANA GUPTA****CLASS: B.A./B.Sc. II****SEMESTER: IV****COURSE CODE: B23-MAT-401****PAPER: ANALYTICAL GEOMETRY & VECTOR CALCULUS****CREDITS: 3****SESSION:2026-27**

Month	Topics	Academic Activity
AUGUST	General equation of second degree: Classification of conic sections; centre, asymptotes, axes, eccentricity, foci and directrices of conics. Tangent at any point to a conic, chord of contact, pole of line to a conic, director circle of a conic. Polar equation of a conic, tangent and normal to a conic, confocal conics.	Assignment 1 to be taken
SEPTEMBER	Sphere: General form, Plane section of a sphere. Sphere through a given circle. Intersection of two spheres, tangent plane and line, polar plane and line, orthogonal spheres, radical plane of two spheres and co-axial system of spheres. Cone: Equation of a cone, right circular cone, quadric cone, enveloping cone. Tangent plane and condition of tangency.	Assignment 2
OCTOBER	Cylinder: Right circular cylinder and enveloping cylinder. Central Conicoids: Equation of tangent plane. Director sphere. Normal to the conicoid. Polar plane of a point. Enveloping cone of a conicoid, Enveloping cylinder of a conicoid, confocal conicoid, reduction of second-degree equations.	Midterm exam

NOVEMBER	Scalar and Vector product of three vectors, four vectors, reciprocal vectors, vector differentiation and derivative along a curve, directional derivatives; Gradient of a scalar point function, divergence and curl of vector point functions, their geometrical meanings and vector identities. Vector integration: line integral, surface integral and volume integral. Theorem of Gauss, Green, Stoke and problems based on these.	Class test
-----------------	---	------------

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: DR. VANDANA GUPTA****CLASS: B.A./B.Sc. III****SEMESTER: V****PAPER: SEQUENCES AND SERIES****COURSE CODE: B23-MAT-501****CREDITS: 3****SESSION:2026-27**

Month	Topics	Academic Activity
AUGUST	Boundedness of the set of real numbers, Least upper bound and Greatest lower bound of a set. Archimedean, algebraic and ordered properties in $\mathbb{R}$. The real number system as a complete ordered field. Neighbourhoods, interior points, isolated points, limit points, Open sets, closed sets, interior of a set, closure of a set in real numbers and their properties. Bolzano-Weierstrass theorem. Open covers, compact sets and Heine-Borel theorem.	Assignment 1 to be taken
SEPTEMBER	Denumerable and non-denumerable sets, Denumerability of integers, rationals and non-denumerability of real numbers. Sequences: Real sequences and their convergence, Theorems on limit of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences and subsequential limits, Limit superior and limit inferior.	Assignment 2 and Mid term exam to be taken
OCTOBER	Infinite series: Convergence and divergence of Infinite Series, Comparison tests of positive terms infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or pseries, D-Alembert's ratio test, Raabe's test, Logarithmic test, Cauchy's nth root test, De-Morgan and Bertrand's test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.	Class test
NOVEMBER	Alternating series, Absolute and conditional convergence, Leibnitz test. Arbitrary series, Abel's and Dirichlet's test, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Riemann's re-arrangement theorem and Pringsheim's theorem (statement only). Cauchy product of series (definitions and examples only).	Class test

INDIRA GANDHI NATIONAL COLLEGE LADWA**LESSON PLAN****NAME OF TEACHER: DR. VANDANA GUPTA****CLASS: B.A./B.Sc III****SEMESTER: VI****PAPER: NUMERICAL ANALYSIS****COURSE CODE: B23-MAT-601****CREDITS: 3****SESSION:2026-27**

Month	Topics	Academic Activity
AUGUST	Round-off error and computer arithmetic, Local and global truncation errors, Algorithms and convergence. Numerical methods for solving algebraic and transcendental equations: Bisection method, False position method, Fixed point iteration method, Newton-Raphson method and Secant method. Newton's iterative method for finding nth root of a number.	Assignment 1
SEPTEMBER	Numerical methods for solving simultaneous linear equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method), Crout's method, Cholesky decomposition method. Iterative methods: Jacobi's method, Gauss-Seidal method, Relaxation method.	Assignment 2
OCTOBER	Finite Differences operators and their relations. Interpolation with equal intervals: Gregory-Newton forward and backward difference interpolations. Interpolation with unequal intervals: Newton's divided difference formulae, Lagrange's Interpolation formulae. Central Differences: Gauss forward and Gauss backward interpolation formulae, Sterling formula, Bessel's formula. Piecewise linear interpolation, Cubic spline interpolation. Numerical Differentiation: First and second derivative of a function using interpolation formulae.	Mid term exam
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 Method. Multiple step methods: Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.	Class test