

Lesson Plan for Session 2023-24

Name: Dr. (Mrs.) Neelam sharma (Mathematics)

Class: B.A.- I + BSc I (Odd Semester)

Paper: Solid Geometry

Week 1	General equation of second degree
Week 2	General equation of second degree, Examples
Week 3	Tracing of conic
Week 4	Tangent at any point to the conic
Week 5	Chord of contact , Pole of a line to the conic
Week 6	Pole of a line to the conic, Director circle of conic, System of conic, Confocal conic
Week 7	Polar equation of conic, Tangent and normal of conic, Sphere: Plane section of a sphere
Week 8	Sphere through a given circle, Intersection of two sphere, Radial plane of two sphere
Week 9	Co-axial system of sphere, Cones: Right circular cones, Right circular cones
Week 10	Enveloping cone, Reciprocal cone
Week 11	Assignment first section, Cylinder: Right circular cylinder , Right circular cylinder, Enveloping cylinder
Week 12	Central conicoids: Equation of tangent plane, Director sphere, Normal to the conicoids
Week 13	Polar plane of point, Enveloping cone of conicoid
Week 14	Paraboloids: Circular section , Plane section of conicoids
Week 15	Generating lines, Confocal conicoid, Reduction of second degree equations, Examples
Week 16	Revision

Name – Dr. Gunjan kalra (Mathematics)

Class and Section: B.Sc. Ist / B.A. Ist

Subject: ALGEBRA

Week 1 Chapter 1: Matrices
Introduction, Matrices- Definition and Types of Matrices, Transpose, Conjugate and Adjoint of Matrices, Theorems on Matrices, Examples on Matrices
Week 2 Chapter 1: Matrices Examples on Matrices, Symmetric Matrix, Skew-Symmetric Matrix, Hermitian Matrix, Skew-Hermitian Matrix
Week 3 Chapter 1: Matrices- Examples Chapter 2: Rank of a Matrix- Sub-Matrix and Minors, Examples, Definition- Rank of a Matrix
Week 4 Chapter 2: Rank of a Matrix Examples, Elementary Operations on Matrices, Theorems, Rank of a Matrix Examples, Equivalent Matrices, Theorems, Echelon Matrix, Examples
Week 5 Chapter 2: Rank of a Matrix Theorems, Examples, Inverse of a Matrix, Examples, Chapter 2: Rank of a Matrix- Normal Form of a Matrix- Definition, Theorems, Examples, Assignment
Week 6 Chapter 3: Characteristic Equation of a Matrix- Characteristic Matrix, Polynomial, Equation and Characteristic roots of a Matrix, Examples
Week 7 Chapter 3: Characteristic Equation of a Matrix Matrix Polynomial and Cayley-Hamilton Theorem, Examples, Theorems, Monic Polynomial – Theorems and Examples
Week 8 Chapter 4: Unitary & Orthogonal Matrices- Definition and Theorems, Examples, Theorems Chapter 5: Solution of Linear Equations using Matrices- System of Non-Homogeneous Linear Equations, Examples
Week 9 Chapter 5: Solution of Linear Equations using Matrices- Examples, System of Linear Homogeneous Equations, Examples, Class Test Chapter 6: Bilinear & Quadratic Forms- Definition- Bilinear & Quadratic Forms, Theorems, Examples
Week 10 Chapter 6: Bilinear & Quadratic Forms- Diagonalization of Quadratic Forms- Definition, Theorems Rank & Index, Lagrange's Method, Positive Definite & Negative Definite Quadratic Forms,

Examples
<p>Week 11</p> <p>Chapter 7: Relation between Roots & Coefficients of an Equation- Definition- Polynomial, Equation, Degree, Roots and related Theorems, Examples, Theorems on roots of an Equation, Examples, Relation between Roots & Coefficients, Examples, Assignment</p>
<p>Week 12</p> <p>Chapter 8: Transformation of Equations- Equation with roots satisfying given condition, Common Roots & Multiple Roots, Transformation of Equations- Roots with sign changed, Roots multiplied by a given number, Reciprocal roots, Examples, Roots diminished by a given number</p>
<p>Week 13</p> <p>Chapter 8: Transformation of Equations- Transformation of a Cubic and Bi-quadratic, Examples, Transformation in General, Examples, Equation of Squared differences of a Cubic,</p> <p>Chapter 9: Solution of Cubic and Bi-quadratic Equations- Cardan's Method of Solving a Cubic Equation, Examples.</p>
<p>Week 14</p> <p>Chapter 9: Solution of Cubic and Bi-quadratic Equations- Cardan's Method of Solving a Cubic Equation, Examples, Descarte's Method of solving a Biquadratic, Descarte's Method of solving a Biquadratic</p>
<p>Week 15</p> <p>Chapter 9: Solution of Cubic and Bi-quadratic Equations- Examples, Ferrari's Method of solving a Bi-quadratic, Examples, Chapter 10: Descarte's Rule of Signs- Definitions, Theorem- Descarte's Rule of Signs, Complex Roots, Examples</p>
<p>Week 16</p> <p>Chapter 10: Descarte's Rule of Signs- Examples</p>

Lesson Plan for Session 2023 - 2024

Name: Dr. Neelam sharma (Mathematics)

Class: B.A.- I / BSc I (Odd Semester)

Paper: Calculus

Week 1	Definition of the limit of a function
Week 2	Basic properties of limits, Examples
Week 3	Continuous functions and some definitions
Week 4	Classification of discontinuous functions, Classification of discontinuous functions, Examples
Week 5	Differentiability
Week 6	Successive differentiation
Week 7	Leibnitz theorem , Examples, Maclaurin and Taylor series expansions
Week 8	Asymptotes in Cartesian coordinates, Intersection of curve and its asymptotes, asymptotes in polar coordinates, Curvature
Week 9	Radius of curvature for cartesian curves, parametric curves, polar curves
Week 10	Newton's method, Radius of curvature for pedal curves, Tangential polar equations
Week 11	Centre of curvature, Chord of curvature, evolutes, Tests for concavity and convexity
Week 12	Points of inflexion, /multiple points, Cusps, nodes and conjugate points, types of cusps
Week 13	Tracing of curves in Cartesian, parametric and polar coordinates
Week 14	Reduction formulae, Rectification, intrinsic equations of curves, Quadrature (area) Sectorial area, Area bounded by closed curves
Week 15	Volumes and surfaces of solids of resolution
Week 16	Test and Revision

Lesson Plan for Session 2023-2024

Name : Dr. Gunjan kalra (Mathematics)

Class and Section: B.Sc.-II /B.A.-II

Subject: - STATICS

Week 1 Chapter 1: Forces acting at a point Introduction- Definition of Force,Tension,Thrust Rigid body, Classification of Forces
Week 2 Chapter 1: Forces acting at a point Rigid body, Classification of Forces, Resultant of Forces, Theorems to find Resultant of forces, Examples, Resolution of Forces, Examples
Week 3 Chapter 1: Forces acting at a point- Triangle Law of Force, $\lambda - \mu$ Theorem, Examples, Examples, Lami's Theorem, Examples
Week 4 Chapter 1: Forces Acting at a Point- Examples, Polygon Law of Forces and theorems on Resolved parts, Examples, Conditions of Equilibrium, Examples
Week 5 Chapter 1: Forces Acting at a Point- Examples, Equilibrium on Inclined Plane, Examples Chapter 2: Parallel Forces - Resultant of Like Parallel Forces
Week 6 Chapter 2: Parallel Forces Resultant of Unlike Parallel Forces, Centre of Parallel Forces, Resolved parts for Parallel Forces, Examples
Week 7 Chapter 3: Moments Definition, Meaning, Examples, Varignon's Theorem, Generalization of Varignon's Theorem, Theorems on Resultant of Forces, Examples
Week 8 Chapter 3: Moments- Centre of Parallel Forces using Moments, Moment about a Line, Examples, Assignment Chapter 4: Couples - Definition, Moment and Sign of Moment of a Couple, Theorem on Moment of a Couple, Theorem on Equilibrium and Resultant of Couples
Week 9 Chapter 4: Couples- Theorems on Couple, Examples, Theorems on Force and Couple, Examples
Week 10 Chapter 5: Analytical conditions of Equilibrium of Co-planar Forces Definition, Theorems, Examples, Theorems on conditions of Equilibrium

<p>Week 11</p> <p>Chapter 5: Analytical conditions of Equilibrium of Co-planar Forces- Theorems on conditions of Equilibrium, Examples, Class Test</p> <p>Chapter 6: Friction- Definition, Stages and Kinds of Friction, Laws of Friction, Angle and Cone of Friction, Theorems on Friction</p>
<p>Week 12</p> <p>Chapter 6: Friction- Theorems on Friction, Examples</p>
<p>Week 13</p> <p>Chapter 7: Centre of Gravity- Definition and some results on Centre of Gravity, More results on Centre of Gravity, Examples, Centre of Gravity by Integration</p>
<p>Week 14</p> <p>Chapter 7: Centre of Gravity - More results on Centre of Gravity by Integration, Examples</p>
<p>Week 15</p> <p>Chapter 8: Virtual Work- Definition, Measurement and Units of Work, Work done by a number of Forces, Virtual Work, Principle of Virtual Work, Principle of Virtual Work in case of a Particle, Principle of Virtual Work in case of a Rigid Body</p>
<p>Week 16</p> <p>Chapter 8: Virtual Work- Some Results on Virtual Work, Examples, Assignment</p> <p>Chapter 9: Forces in Three Dimensions- Law of Parallelopiped of Forces, Axis of a Couple, Resultant of Concurrent Forces</p>
<p>Week 17</p> <p>Chapter 9: Forces in Three Dimensions- Poinot's Central Axis, Equation of Central Axis, Examples</p>
<p>Week 18</p> <p>Chapter 10: Wrenches- Introduction and Theorems on Wrenches, Theorems, Examples</p> <p>Chapter 11: Null lines and Null planes- Definition and Theorems on Null line and Null plane, Theorems and Examples</p>
<p>Week 19</p> <p>Chapter 10: Stable, Unstable and Neutral Equilibrium- Equilibrium of Bodies, States of Equilibrium and Conditions of Stability, Theorem on Stability- Spherical bodies, Theorem on Stability- Spherical and Concave bodies, Examples</p>
<p>Week 20</p> <p>Chapter 10: Stable, Unstable and Neutral Equilibrium- Examples</p>

Lesson Plan for Session 2023-2024

Name: Dr. Gunjan kalra (Mathematics)

Class: B.A.- II / BSc II (Odd Semester)

Paper: Partial Differential Equation

Week 1	Introduction of partial differential equation
Week 2	Introduction of partial differential equation, Examples
Week 3	formation and order and degree of P.D.E
Week 4	formation and order and degree of P.D.E, Examples
Week 5	Exercise problems
Week 6	Linear P.D.E of first order
Week 7	Linear P.D.E of first order, Examples
Week 8	Exercise Problems
Week 9	Non-Linear P.D.E of first order, Examples
Week 10	Exercise problems
Week 11	Complete solution
Week 12	Complete solution, Examples
Week 13	Singular solution
Week 14	Singular solution, examples
Week 15	General Solution with examples
Week 16	Solution of Lagrange's linear equations
Week 17	Charpit's general method of solution with examples
Week 18	Compatible system of first order equations
Week 19	Jacobi's method
Week 20	Revision

Lesson Plan for Session 2023-2024

Name: Dr. (Mrs.) Neelam sharma (Mathematics)

Class: B.A.- II / BSc II(Odd Semester)

Paper: Advanced Calculus

Week 1	Continuity ,examples
Week 2	Sequential continuity, properties of continuous functions, uniform continuity
Week 3	Limit and continuity of real valued functions of two variables
Week 4	Partial differentiation
Week 5	Homogenous functions and Euler's theorem, taylor theorem for functions of two variable
Week 6	Taylor's theorem for function of two variables, total differentiation
Week 7	Homogenous functions and Euler's theorem, taylor theorem for functions of two variable
Week 8	Taylor's theorem for function of two variables, total differentiation
Week 9	Maxima, minima and saddle points of two variables langrange's method of multipliers
Week 10	Differentiability of real valued functions of two variables
Week 11	Schwarz and young's theorem
Week 12	implicit function theorem
Week 13	Curves, tangents
Week 14	Binormals and principal normal
Week 15	serret frenet formulae
Week 16	locus of centre of curvature, spherical curvature
Week 17	Mean value theorem , rolls theorem, Langrange's mean value theorem
Week 18	Indeterminate forms
Week 19	Darboux intermediate value theorem for derivatives
Week 20	Test and Revision

Lesson Plan for Session 2023-2024

Name: Dr. Neelam sharma (Mathematics)

Class: B.A.- III (Odd Semester)

Paper: Groups and Rings

Week 1	Chapter 1: Groups and Subgroups- Introduction, Binary composition, Properties of Binary operation, definition of Group
Week 2	Chapter 1: Groups and Subgroups- Examples of Group, Theorems on Group, Examples
Week 3	Chapter 1: Groups and Subgroups- Examples, Theorems on order of Group/ Element, Definition of Subgroup and Theorems on subgroup
Week 4	Chapter 1: Groups and Subgroups- Theorems on subgroup, Examples on subgroup, Definition- Cyclic group and Examples, Theorems on Cyclic groups
Week 5	Chapter 2: Groups and Subgroups- Theorems on Cyclic groups, Examples on Cyclic groups Chapter 3: Cosets- Definition, Examples on Cosets, Theorems on Cosets
Week 6	Chapter 2: Cosets- Examples on Coset, Equivalence Class and Lagrange's Theorem, Theorems on Normal subgroup, Quotient groups, Theorems on Quotient groups
Week 7	Chapter 2: Cosets- Examples on Quotient groups, Assignment Chapter 3: Homomorphisms and Automorphisms- Definition- Homomorphisms and Automorphisms, Theorems and Examples on Homomorphisms and Automorphisms, Some more Theorems on Homomorphisms and Automorphisms, Kernel of Homomorphisms and theorems on Kernel, Theorems on Isomorphism
Week 8	Chapter 3: Homomorphisms and Automorphisms- Some more Theorems and Examples on Isomorphism, Automorphism and related Theorems, Examples on Automorphisms, Group of Automorphisms, Inner Automorphisms- Definition and Examples
Week 9	Chapter 3: Homomorphisms and Automorphisms- Theorems on Inner Automorphisms, Group of Automorphisms of Cyclic groups, Examples on Group of Automorphisms of Cyclic groups, Centre of Group, Theorems and Examples on Centre of group, Characteristic subgroups and Normalizer of an Element

Week 10	Chapter 4: Permutation Groups- Commutator, Class test, Permutation - Definition, Properties and Examples, Examples of Permutation, Cyclic Permutation, Transposition and Disjoint Cycles, Even and Odd permutation, Alternating Group, Cayley's Theorem
Week 11	Chapter 5: Rings and Fields- Definition and Examples of Rings, Examples of Rings, Integral Domain, Field, Theorems, Examples, Subring
Week 12	Chapter 5: Rings and Fields- Theorems, Centre of a Ring, Characteristic of a Ring, Examples
Week 13	Chapter 6: Ideals and Quotient Rings- Definitions of Ideals, Examples, Theorems on Ideals, Product of Ideals, Simple Ring, Principal Ideal, Theorems
Week 14	Chapter 6: Ideals and Quotient Rings- Principal Ideal Ring and Principal Ideal Domain, Theorems
Week 15	Chapter 6: Ideals and Quotient Rings- Maximal Ideal and Prime Ideal, Examples, Quotient Rings, Assignment
Week 16	Chapter 7: Homomorphisms of Rings- Ring Homomorphism, Theorems and Kernel of Ring Homomorphism, Examples, Theorems, Examples and Embedding of Rings
Week 17	Chapter 8: Euclidean Rings- Definitions and Theorems, Euclidean Rings, Theorems, Principal Ideal Domain
Week 18	Chapter 8: Euclidean Rings- Examples and Theorems on PID Chapter 9: Polynomial Rings- Definition of Polynomial Ring, Examples, Theorems, Polynomial Ring over a Ring, Embedding of Ring into Polynomial Ring, Polynomials over a Field, Divisibility of Polynomials
Week 19	Chapter 9: Polynomial Rings- Unique Factorization Domain- Definition and Theorems, Theorems on UFD, Primitive Polynomial, Gauss Lemma, Related Theorems, Eisenstein's Irreducibility Criterion
Week 20	Chapter 9: Polynomial Rings- Examples

Lesson Plan for Session 2023-2024

Name: Dr. Gunjan kalra

Class: B.A. III (Odd Semester)

Paper: Real Analysis

Week 1	Riemann integral
Week 2	Riemann integral
Week 3	Inegrability of continuous and monotonic functions
Week 4	The fundamental theorems of integral calculus
Week 5	Mean value theorems of integral calculus
Week 6	Assignment-I, Improper integral and their convergence
Week 7	Comparison tests , Abel's and Dirichlet's tests
Week 8	Frullani's integral, Integral as a function of parameter, Continuity, Differentiability and integrability of an integral of a function of parameter
Week 9	Definition and example of metric space, Neighborhood, Limit points, Interior points Open and closed sets
Week 10	Closure and interior, Boundary points, Subspace of metric space
Week 11	Subspace of metric space ,Equivalent metrics, Cauchy sequences
Week 12	Completeness, Cantor's intersections theorem, Baire's category theorem, Contraction principle
Week 13	Assignment-II, Continuous functions, Uniform continuity, Completeness for metric spaces, Sequential compactness
Week 14	Sequential compactness Bolzano-Weierstress property, Total boundness
Week 15	Finite interaction property, Continuity in relation with compactness, Connectedness, Components
Week 16	Components
Week 17	Continuity in relation with connectedness
Week 18	Test, Revision
Week 19	Revision
Week 20	Revision

Lesson Plan for Session 2023-2024

Name: Dr. Neelam sharma

Class: B.A. III (Odd Semester)

Paper: Numerical Analysis

Week 1	Finite Difference Operators- Function, Argument, Entry, Interval of difference, Forward and Backward differences & related questions, Fundamental Theorem of Difference Calculus
Week 2	Properties of operator Δ , Difference of functions and related question, Shift operator E, properties, Relation between E, Δ & ∇ , Problems & Exercise, Practical on Newton forward difference
Week 3	Effect of error in tabular value, Taking queries of students, Class Test: Finite difference operators, Interpolation , Newton – Gregory formula for forward & interpolation, Questions, Subdivision of intervals, Problems & Exercise Practical on Newton Backward difference
Week 4	Divided difference, Theorems, Newton divided difference formula for unequal interval, Relation between Δ Practical on lagrange's formula
Week 5	Lagrange's interpolation formula , Hermite's formula, Examples Practical on Trapezoidal Rule
Week 6	Sterling formula, Examples, Practical on Simpson's rules
Week 7	Bessel's formula, Examples , Probability Distributions – Introduction, Review of probability, Practical on Jacobi's method
Week 8	Mean & Variance of a random variable, Problems & Exercise
Week 9	Binomial distribution, Examples, Mean & Variance of Binomial distribution, Examples, Fitting a Binomial distribution, Practical on Given's method
Week 10	Poission Distribution, Mean & variance, Examples , One Assignment
Week 11	Normal Distribution, Examples, Presentation- Normal distribution, Practical on Newton's divided difference
Week 12	Numerical differentiation: Derivatives using Newton Forward & Backward formula, Derivatives using Sterling , Bessel's Central Diff. formula, Derivative using Newton's Divided Diff. formula. Practical on Given's method
Week 13	Review of Eigen Values & Eigen Vectors, Power method, Jacobi's method, Given method Examples, Practical on Power's method
Week 14	House- Holder's Method, QR & Lanczo Method , Examples Practical on

	Euler' s method
Week 15	Numerical integration- Introduction, Newton Cotes Quadrature formula, Trapezoidal rule, Examples
Week 16	Simpson's one-third & three-eight rule, Gauss's Quadrature & Chebyshe's formula, Examples, Practical on Euler' s modified method
Week 17	Numerical solution of ordinary Differential Equation, Introduction Euler's Method , Examples, Euler's Modified method, Taylor's series method, Runge Kutta, Examples Practical on Taylor' s method
Week 18	Picard's Method, Micae-Simpson's Method, Adams- Bashforth Method examples, Practical on RK method
Week 19	Revision
Week 20	Revision