Government College for Girls, Unhani (Mahendergarh)

Lesson Plan for Session 2025-2026 (August 2025 – November 2025)

Name of Assistant Professor : Seema (Mathematics)

Class: BSc II (Third Semester)

Paper: Differential Equations -I

Duration	Topic to be Covered
1st Week of August	Basic concepts and genesis of ordinary differential equations, Order and degree of a differential equation.
2nd Week of August	Solutions of differential equations of first order and first degree.
3rd Week of August	Exact differential equations, Integrating factor.
4th Week of August	First order higher degree equations solvable for x, y and p, Lagrange's equations, Clairaut's form and singular solutions, Assignment -I ,Class Test.
1st Week of Sept.	Solutions of linear ordinary differential equations with constant coefficients,
2nd Week of Sept.	Linear non-homogeneous differential equations.
3rd Week of Sept.	Linear differential equation of second order with variable coefficients, Class Test.
4th Week of Sept.	Method of reduction of order, method of undetermined coefficients, method of variation of parameters. Cauchy-Euler equation, Assignment -II
1st Week of Oct.	Solution of simultaneous differential equations, total differential equations.
2nd Week of Oct.	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.
3rd Week of Oct.	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 $q = \partial z/\partial y$
4th Week of Oct.	Compatible systems of first order equations. Charpit's method, Class Test.
1st Week of Nov.	Special types of first order PDEs, Jacobi's method.
2nd Week of Nov.	Second Order Partial Differential Equations with Constant Coefficients. Revision and Class test.
3rd Week of Nov.	Orthogonal trajectories of one-parameter families of curves in a plane.
4th Week of Nov.	Full Syllabus test.

SEEMA (Assistant Professor)
Dept. of Mathematics.

Lesson Plan for Session 2025-2026 (August 2025 – November 2025)

Name of Assistant Professor: Seema (Mathematics)

Class: BSc III / B.A.- III (5th Semester)

Paper: Groups and Rings

Duration	Topic to be Covered
1st Week of August	Groups and Subgroups- Introduction, Binary composition, Properties of Binary operation, definition of Group, Examples of Group
2nd Week of August	Theorems on Group, Theorems on order of Group/ Element, Examples
3rd Week of August	Definition of Subgroup and Theorems on subgroup, Examples on subgroup, Definition- Cyclic group and Examples, Theorems on Cyclic groups
4th Week of August	Cosets- Definition, Examples on Cosets, Theorems on Cosets, Equivalence Class and Lagrange's Theorem
1st Week of Sept.	Normal subgroup, Quotient groups, theorems on Normal subgroup, Quotient groups, Theorems on Quotient groups
2nd Week of Sept.	Homomorphisms and Automorphisms, Theorems and Examples , Kernel of Homomorphisms , Assignment 1.
3rd Week of Sept.	Isomorphism, Theorems and Examples on Isomorphism, Automorphism and related Theorems, Group of Automorphisms, Inner Automorphisms and related examples.
4th Week of Sept.	Inner Automorphisms- Definition and Examples Inner Automorphisms, Group of Automorphisms of Cyclic groups, Centre of Group, Characteristic subgroups and Normalizer of an Element, Class Test.
1st Week of Oct.	Permutation Groups- Commutator, Cyclic Permutation, Transposition and Disjoint Cycles, Even and Odd permutation, Alternating Group.
2nd Week of Oct.	Cayley's Theorem Rings, Integral Domain, Field, Subring , Centre of a Ring, Characteristic of a Ring, Examples
3rd Week of Oct.	Ideals, Product of Ideals, Simple Ring, Principal Ideal, Theorems - Principal Ideal Ring and Principal Ideal Domain, Maximal Ideal and Prime Ideal, Examples, Quotient Rings, Assignment 2
4th Week of Oct.	Ring Homomorphism, Kernal of Ring Homomorphism, Examples, Theorems and Embedding of Rings Euclidean Rings- Definitions and Theorems, Principal Ideal Domain .
1st Week of Nov.	Polynomial Rings , Polynomial Ring over a Ring, Emdedding of Ring into Polynomial Ring, Polynomials over a Field, Divisibility of Polynomials
2nd Week of Nov.	Unique Factorization Domain- Definition and Theorems, Theorems on UFD, Primitive Polynomial.
3rd Week of Nov.	Gauss Lemma, Related Theorems, Eisenstein's Irreducibility Criterion,
4th Week of Nov.	Polynomial Rings , Revision and Test.

Lesson Plan for Session 2025-2026 (August 2025 – November 2025)

Name of Assistant Professor: Seema (Mathematics)

Class: BSc III / B.A.- III (5th Semester)

Paper: Numerical Analysis

Duration	Topic to be Covered
1st Week of August	Finite Difference Operators- Function, Argument, Entry, Interval of difference
2nd Week of August	Forward and Backward differences & related questions, Fundamental Theorem of Difference Calculus
3rd Week of August	Properties of operator Δ, Difference of functions and related question, Shift operator E, properties, Relation between E & ∇, Problems & Exercise
4th Week of August	Effect of error in tabular value, Taking queries of students, Class Test
1st Week of Sept.	Finite difference operators, Interpolation , Newton – Gregory formula for forward & interpolation, Questions, Subdivision of intervals, Problems & Exercise
2nd Week of Sept.	Newton Backward difference, Divided difference, Theorems. Assignment I
3rd Week of Sept.	Newton divided difference formula for unequal interval, Relation between Δ , Class Test
4th Week of Sept.	Lagrange's interpolation formula , Hermite's formula, Sterling formula, Examples
1st Week of Oct.	Bessel's formula, Examples , Probability Distributions – Introduction, Review of probability
2nd Week of Oct.	Mean & Variance of a random variable, Binomial distribution, Examples, Mean & Variance of Binomial distribution, Examples, Fitting a Binomial distribution
3rd Week of Oct.	Poission Distribution, Mean & variance, Practical on Given' s method, Class Test
4th Week of Oct.	Normal Distribution, Examples, Presentation- Normal distribution, Practical on Newton's divided difference, Assignment II.
1st Week of Nov.	Numerical differentiation: Derivatives using Newton Forward & Backward formula, Derivatives using Sterling , Bessel's Central Diff. formula, Derivative using Newton's Divided Diff. formula.
2nd Week of Nov.	Eigen Values & Eigen Vectors, Power method, Jacobi's method, Given method Examples
3rd Week of Nov.	House- Holder's Method, QR & Lanczo Method, Numerical integration- Trapezoidal rule, Examples
4th Week of Nov.	Revision & Test

Lesson Plan for Session 2025-2026 (August 2025 – November 2025)

Name of Assistant Professor: Seema (Mathematics)

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

Paper: Calculus

Duration	Topic to be Covered
1st Week of August	ε-δ definition of limit and continuity of a real valued function and related examples
2nd Week of August	Basic properties of limits, Types of discontinuities , related examples
3rd Week of August	Differentiability of functions, Application of L'Hospital rule to indeterminate forms
4th Week of August	Application of L'Hospital rule to indeterminate forms
1st Week of Sept.	Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's series expansion with different forms of remainder
2nd Week of Sept.	Leibnitz theorem, Taylor's and Maclaurin's series expansion with different forms of remainder
3rd Week of Sept.	Asymptotes: Horizontal, vertical and oblique asymptotes for algebraic curves, related exercise
4th Week of Sept.	Asymptotes for polar curves, Intersection of a curve and its asymptotes
1st Week of Oct.	Curvature and radius of curvature of curves (cartesian, parametric, polar & intrinsic forms)
2nd Week of Oct.	Newton's method, Centre of curvature and circle of curvature.
3rd Week of Oct.	Multiple points, Node, Cusp, Conjugate point, Tests for concavity and convexity
4th Week of Oct.	Points of inflexion, Tracing of curves, Reduction formulae.
1st Week of Nov.	Rectification, intrinsic equation of a curve
2nd Week of Nov.	Quadrature, Area bounded by closed curves
3rd Week of Nov.	Volumes and surfaces of solids of revolution
4th Week of Nov.	Doubt class and full syllabus test.