

## Government College for Girls, Unhani

### Lesson Plan for Session 2023-2024 (January 2024- April 2024)

Name- Seema (Asst. Prof. Dept. of Mathematics)

Class- BSc. I + B.A I (Even Semester)

Paper- Ordinary Differential Equations

S.no.	Duration	Topics to be covered
1.	3rd Week of January	Geometrical meaning of a differential equation. Exact differential equations
2.	4th Week of January	Integrating factors, First order higher degree equations solvable for x,y Lagrange's equations
3.	1st Week of February	First order higher degree equations solvable for p Lagrange's equations, Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions, Class Test Chapter 1 .
4.	2nd Week of February	Orthogonal trajectories: in Cartesian coordinates and polar coordinates
5.	3rd Week of February	Self orthogonal family of curves.. Linear differential equations with constant coefficients, Assignment.
6.	4th Week of February	Homogeneous linear ordinary differential equations. Equations reducible to homogeneous linear ordinary differential equations, Class Test .
7.	1st Week of March	Equations reducible to homogeneous linear ordinary differential equations, Linear differential equations of second order- Reduction to normal form

8.	2nd Week of March	Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations, Class Test.
9.	3rd Week of March	Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients, Assignment.
10.	4th Week of March	Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators $x$ ( $d/dx$ ) or $t$ ( $d/dt$ ) etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$ .
11.	1st Week of April	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,
12.	2nd Week of April	Method of auxiliary equations.
13.	3rd Week of April	Revision and Doubt Class and Test.
14.	4th week of April	Revision and <b>Tests</b>

## Lesson Plan for Session 2023-2024 (Jan 2024- April 2024)

Name : Seema (Asst. Prof. Mathematics)

Class : BSc. II + BA II( Even Semester)

Paper : Special Functions and Integral Transforms

S.no.	Duration	Topics to be covered
1.	3rd Week of January	Series solution of differential equations – Power series method
2.	4th Week of January	Power series method, Examples, Definitions of Beta and Gamma functions.
3.	1st Week of February	Examples Related to Beta and Gamma functions, Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions.
4.	2nd Week of February	Legendre differential equations and their solutions: Legendre functions and their properties-Recurrence Relations and generating functions. Orthogonality of Legendre polynomials. Rodrigues' Formula for Legendre Polynomials, Laplace Integral Representation of Legendre polynomial. Class Test
5.	3rd Week of February	Hermite differential equations and their solutions, Hermite functions and their properties-Recurrence Relations and generating functions. Orthogonality of Hermite polynomials. Rodrigues' Formula for Hermite Polynomials, Examples. Assignment I.

6.	4th Week of February	Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals.
7.	1st Week of March	Differentiation and integration of Laplace transforms, Convolution theorem
8.	2nd Week of March	Inverse Laplace transforms, convolution theorem
9.	3rd Week of March	Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform. Class Test.
10.	4th Week of March	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem, Related Examples, Assignment 2.
11.	1st Week of April	Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, Examples
12.	2nd Week of April	Solution of differential Equations using Fourier Transforms, Examples & Class Test.
13.	3rd Week of April	Doubt Classes, Revision & Test.
14.	4th week of April	Revision and <b>Tests</b>

Lesson Plan for Session 2023-2024 (Jan 2024- April 2024)

Name: Seema (Asst. Prof. Mathematics)

Class: B.A.- II+ BSc II (Even Semester)

Paper: Programming in C and Numerical Methods

S.no.	Duration	Topics to be covered
1.	3rd Week of January	Programmer's model of a computer, Algorithms, Flow charts
2.	4th Week of January	Data types, Operators and expressions, Input / outputs functions.
3.	1st Week of February	Decisions control structure: Decision statements, Logical and conditional statements, Implementation of Loops.
4.	2nd Week of February	Switch Statement & Case control structures. Functions, Preprocessors and Arrays. Assignment 1
5.	3rd Week of February	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.
6.	4th Week of February	Pointers Data type, Pointers and Arrays, Pointers and Functions. Solution of Algebraic

		and Transcendental equations by Bisection method, Assignment and Class test .
7.	1st Week of March	Regula-Falsi method, Secant method, Newton-Raphson's method and Related Examples & Class test.
8.	2nd Week of March	Newton's iterative method for finding pth root of a number, Order of convergence of above methods .
9.	3rd Week of March	Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Related Examples and Assignment.
10.	4th Week of March	Triangularization method (LU decomposition method). Crout's method and Related Examples. Class Test.
11.	1st Week of April	Cholesky Decomposition method. Iterative method, Jacobi's method
12.	2nd Week of April	Gauss-Seidal's method, Relaxation method and Related Problems.
13.	3rd Week of April	Revision and Class Test.
14.	4th week of April	Revision and <b>Tests</b>

Lesson Plan for Session 2023-2024 (Jan 2024-April 2024)

Name- Seema (Asst. Prof. Mathematics)

Class- BSc III+ BA III ( Even Semester)

Paper-Real & Complex Analysis

S.no.	Duration	Topics to be covered
1.	3rd Week of January	Jacobians, Beta and Gamma functions
2.	4th Week of January	Beta and Gamma functions related Examples, Class Test, Double integrals.
3.	1st Week of February	Triple integrals, Dirichlets integrals, change of order of integration in double integrals.
4.	2nd Week of February	Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co- efficient. Class Test.
5.	3rd Week of February	Dirichlet's conditions, Parseval's identity for Fourier series
6.	4th Week of February	Fourier series for even and odd functions & Related Examples .Class Test & Assignment.
7.	1st Week of March	Fourier series for even and odd functions, Half range series, Change of Intervals, Assignment.
8.	2nd Week of March	Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions & Class Test
9.	3rd Week of	Continuity and differentiability of

	March	complex functions, Analytic functions.
10.	4th Week of March	Analytic functions related Examples , Cauchy-Riemann equations. Harmonic functions. Class Test.
11.	1st Week of April	Analytic functions, Cauchy-Riemann equations. Harmonic functions. Class Test
12.	2nd Week of April	Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings. Class Test, Assignment.
13.	3rd Week of April	Mobius transformations. Fixed points, Cross ratio, Inverse Points and critical mappings, Class Test.
14.	4th week of April	Revision and <b>Tests</b>



Lesson Plan for Session 2023-2024 (Jan - April 2024)

Name: Seema (Asst. prof. Mathematics)

Class: B.A.- III+ BSc III (Even Semester)

Paper: Linear Algebra

S.no.	Duration	Topics to be covered
1.	3rd Week of January	Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space.
2.	4th Week of January	Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces. Class Test 1.
3.	1st Week of February	Invariance of the number of elements of bases sets, Dimensions. Class Test of Vector Space.
4.	2nd Week of February	Quotient space and its dimension & Theorems related to Quotient space & Assignment 1.
5.	3rd Week of February	Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces. Vector space of all the linear transformations.
6.	4th Week of February	Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces. Class Test 2.
7.	1st Week of March	Null Space, Range space of a linear transformation,

		Rank and Nullity Theorem. Algebra of Linear Transformation, Matrix of a linear Transformation, Change of basis.
8.	2nd Week of March	Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Eigen values and Eigen vectors of linear transformations. Assignment 2.
9.	3rd Week of March	Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements.
10.	4th Week of March	Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces.
11.	1st Week of April	Gram- Schmidt, Orthogonalization process. Class Test
12.	2nd Week of April	Adjoint of a linear transformation and its properties, Unitary linear transformations.
13.	3rd Week of April	Class Test & Revision.
14.	4th week of April	Revision and <b>Tests</b>