

LESSON PLAN (2022-23)

Name of Teacher – Dr. Neha Mittal

Subject: - Mathematics

Paper – O.D.E

Class –B.A/B.Sc. I

Semester - 2nd

Weeks With Months	Contents
Feb 13, 2023 - Feb 18, 2023	Basics, Unit-1 Geometrical meaning of a D.E, Exact D.E, integrating factors
Feb 20 – Feb 25	First order higher degree equations, Lagrange's equations, Problem discussion
Feb 27- March 04	Clairaut equations, Equations reducible to Clairaut's form
March 06 - March 11	Singular solution
March 13 – March 18	Assignment-1, Unit-2, Orthogonal Trajectories in Cartesian and polar coordinates, self orthogonal family of curves
March 20 - March 25	Linear D.E. with constant coefficients, Problem discussion
March 27 - April 01	Linear D.E. with constant coefficients
April 03 – April 08	Homogenous linear ordinary D.E, Problem Discussin
April 10 - April 15	Equations reducible to homogenous
April 17 - April 22	Assignment-2, Unit-3 Linear D.E. of second order, reduction to normal form, Transformation of the equation by changing dependent variable/independent variable
April 24 - April 29	Solution by operators of non homogenous linear differential equations, reduction of order of a D.E
May 01 - May 06	Method of variation of parameters, Method of undetermined coefficients
May 08 - May 13	Test, Unit-4 ordinary simultaneous D.E, solution of simultaneous D.E, Total D.E, Problem Discussion
May 15 – May 19	Conditions 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, Revision

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LESSON PLAN (2022-23)

Name of Teacher – Dr. Neha Mittal

Subject: - Mathematics

Paper – Special Functions and Integral Transforms

Class –B.A/B.Sc. II

Semester – 4th

Weeks With Months	Contents
Feb 13, 2023 - Feb 18, 2023	Basics, Unit – 1 Series Solution of D.E: Power Series Method, Definition of Beta Gamma Functions, Bessel equation and its solution
Feb 20 – Feb 25	Bessel Functions and its properties, Convergence, Recurrence relation and generating functions
Feb 27- March 04	Orthogonality of Bessel functions, Problem Discussion, Assignment - 1
March 06 - March 11	Unit -2 Legendre and Hermite D.E. and their solutions, Legendre and Hermite's functions and their properties
March 13 – March 18	Recurrence Relation and generating functions, Orthogonality of Legendre and Hermite Polynomials
March 20 - March 25	Rodrigues formula for Legendre and Hermite Polynomials, Problem discussion
March 27 - April 01	Laplace Integral Representation of Legendre Polynomial, Assignment -2
April 03 – April 08	Unit – 3 Laplace Transforms:- Existence Theorem, Linearity of Laplace Transforms, Shifting theorem, Laplace transforms of derivatives and integrals
April 10 - April 15	Differentiation and integration of Laplace Transforms, Convolution Theorem, Problem Discussion
April 17 - April 22	Inverse Laplace Transforms, Convolution Theorem, Inverse Laplace Transforms of derivatives and integrals
April 24 - April 29	Solution of O.D.E. using Laplace transforms, Problem discussion, Unit test
May 01 - May 06	Unit – 4 Fourier Transforms: Linearity property, Shifting Modulation, Convolution Theorem, Fourier Transforms of derivatives, Relation between Fourier Transforms and Laplace Transforms
May 08 - May 13	Parseval's identity for Fourier Transforms, Solution of D.E. using Fourier Transforms, Revision
May 15 – May 19	Revision

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LESSON PLAN (2022-23)

Name of Teacher – Dr. Neha Mittal

Subject: - Mathematics

Paper – Linear Algebra

Class – B.A/B.Sc. III

Semester – 6th

Weeks With Months	Contents
Feb 13, 2023 - Feb 18, 2023	Basics, Unit -1 Vector Spaces, subspaces, sum and direct sum of subspaces
Feb 20 – Feb 25	Linear span, Linearly dependent and independent subset of a vector space, Finitely generated vector space, Problem Discussion
Feb 27- March 04	Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces
March 06 - March 11	Invariance of the number of elements of basis sets and Dimensions, Problem discussion
March 13 – March 18	Quotient space and its dimension, Assignment - 1
March 20 - March 25	Unit – 2 Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector sapce
March 27 - April 01	Vector space of all the linear transformations Dual Spaces, Bidual spaces, Problem discussion
April 03 – April 08	Annihilator of subspaces of finite dimensional vector spaces, Null space, Range space of a linear transformation, Rank and Nullity theorem, Assignment - 2
April 10 - April 15	Unit – 3 Algebra of Linear Transformation, Minimal Polynomial of a Linear transformation, Singular and non-singular Linear transformation, Matrix of linear transformation
April 17 - April 22	Change of basis, Eigen Values and Eigen vectors of L.T, Unit test
April 24 - April 29	Unit – 4 Inner Product space and Cauchy Scwarz Inequality, Problem discussion
May 01 - May 06	Orthogonal Vectors, Orthogonal Compliments, Orthogonal sets and basis, Bessel's inequality for finite dimensional vector spaces
May 08 - May 13	Gram Schmidt Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations
May 15 – May 19	Revision

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LESSON PLAN (2022-23)

Name of Teacher – Dr. Neha Mittal

Subject: - Mathematics

Paper – No. Theory

Class – B.A/B.Sc. I

Semester – 2nd

Weeks With Months	Contents
Feb 13, 2023 - Feb 15, 2023	Basics, Divisibility
Feb 20 – Feb 22	G.C.D.(greatest common divisors), L.C.M.(least common multiple)
Feb 27- March 1	Primes, Fundamental Theorem of Arithmetic.
March 06 - March 08	Linear Congruence and its Properties
March 13 – March 15	Fermat's theorem and its Properties, Problem discussion
March 20 - March 22	Wilson's theorem and its converse, Assignment - 1
March 27 - April 29	Linear Diophantine equations in two variables
April 03 – April 05	Complete residue system, Reduced residue system modulo m .
April 10 - April 12	Euler's ϕ function and its Properties, Problem discussion
April 17 - April 19	Euler's generalization of Fermat's theorem, Unit test
April 24 - April 26	Chinese Remainder Theorem and its Application, Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law, Greatest integer function, Problem discussion
May 01 - May 03	The number of divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $\tau(n)$). Mobius function and Mobius inversion formula, Test
May 08 - May 10	Revision
May 15 – May 17	Revision

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