

Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik
Class and Section : B.Sc (NM) & B.A 1st Semester
Session : 2023-2024
Subject : Algebra

Month	Topic
July 2023	Symmetric, Skew-symmetric, Hermitian and Skew-Hermitian matrices, Elementary operations on matrices, Rank of a matrix, Linear dependence and independence of rows and columns of a matrix.
August 2023	Row rank and column rank of a matrix. Eigen values, Eigen vectors and the characteristics equation of a matrix. Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.
September 2023	Application of a matrices to a system of linear equations. Theorems on consistency of a system of linear equations. Unitary and Orthogonal Matrices, Bilinear and Quadratic forms. Relation between the roots and coefficients of general polynomial equation in one variable.
October 2023	Solutions of polynomial equations having conditions on roots. Common roots and multiple roots. Transformation of equations. Nature of roots of an equation. Descarte's rule of signs.
November 2023	Solution of cubic equations. Biquadratic equations and their solutions.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik
Class and Section : B.Sc (NM) & B.A Ist Semester
Session : 2023-2024
Subject : Solid Geometry

Month	Topic
July 2023	General equation of second degree. Tracing of conics. Tangent at any point to the conic, chord of contact, pole of line to the conic, director circle of conic.
August 2023	System of conics. Confocal conics. Polar equation of a conic, tangent and normal to the conic. Sphere: Plane section of a sphere. Sphere through a given circle. Intersection of two spheres, radical plane of two spheres.
September 2023	Co-oxal system of spheres Cones. Right circular cone, enveloping cone and reciprocal cone. Cylinder: Right circular cylinder and enveloping cylinder.
October 2023	Central Conicoids: Equation of tangent plane. Director sphere. Normal to the conicoids. Polar plane of a point. Enveloping cone of a coinoid. Enveloping cylinder of a coinoid.
November 2023	Paraboloids: Circular section, Plane sections of conicoids. Generating lines. Confocal conicoid. Reduction of second degree equations.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik
Class and Section : B.Sc 3rd Semester (Non- Medical)
Session : 2023-2024
Subject : Partial Differential Equation

Month	Topic
July 2023	Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution, singular solution.
August 2023	General solution, Solution of Lagrange's linear equations, Charpit's general method of solution. Compatible systems of first order equations, Jacobi's method. Linear partial differential equations of second and higher orders, Linear and non-linear homogenous and non-homogenous equations with constant co-efficients.
September 2023	Partial differential equation with variable co-efficients reducible to equations with constant coefficients, their complimentary functions and particular Integrals, Equations reducible to linear equations with constant co-efficients. Classification of linear partial differential equations of second order, Hyperbolic, parabolic and elliptic types.
October 2023	Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions, Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order, Cauchy's problem for second order partial differential equations, Characteristic equations and characteristic curves of second order partial differential equation
November 2023	Method of separation of variables: Solution of Laplace's equation, Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system & Revision.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik
Class and Section : B.Com (Hons.)
Session : 2023-2024
Subject : Business Mathematics

Month	Topic
July 2023	Algebra of matrices, Determinants, Adjoint and Inverse of a matrix.
August 2023	Elementary operations on matrices, System of linear equations, Leontif Input Output Model.
September 2023	Compound Interest, Annuities, Time value of Money.
October 2023	Differentiation (Algebraic values only), Integration by substitution and by parts (Algebraic values only). Linear Programming: Graphic Method (Upto two variables only).
November 2023	Simplex Method (Upto three variables only), Set Theory.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik

Class and Section : B.Sc (NM) & B.A (Maths) 2nd Semester

Session : 2023-2024

Subject : Ordinary Differential Equations

S.No	Month	Topics
1	January 2024	Geometrical meaning of a differential equation, Exact differential equations. Integrating factors. First order higher degree equations solvable for x,y,p. Lagrange's equations, Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions. Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves.. Linear differential equations with constant coefficients.
2	February, 2024	Homogeneous linear ordinary differential equations. Equations reducible to homogeneous linear ordinary differential equations. Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation.
3	March, 2024	Method of variations of parameters. Method of undetermined coefficients. Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators (d/dx) or (d/dt) etc.
4	April, 2024	Simultaneous equation of the form $dx/P = dy/Q = dz/R$. 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. Method of auxiliary equations.

Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik

Class and Section : B.Sc (Non- Medical) & B.A 2nd Semester

Session : 2023-2024

Subject : Number Theory and Trigonometry

S.No	Month	Topics
1	January, 2024	Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithmetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse.
2	February, 2024	Linear Diophantine equations in two variables. Complete residue system and reduced residue system modulo m. Euler's ϕ function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem.
3	March, 2024	Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function $[x]$.
4	April, 2024	The number of divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $V(n)$). Moebius function and Moebius inversion formula.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik
Class and Section : B.Sc (Non-Medical) & B.A 4th semester
Session : 2023-2024
Subject : Special Functions and Integral Transforms

S.No	Month	Topics
1	January, 2024	Series solution of differential equations – Power series method, Definitions of Beta and Gamma functions. Bessel equation and its solution: Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions.
2	February, 2024	Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions. Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials, Laplace Integral Representation of Legendre polynomial.
3	March, 2024	Fourier transforms: Linearity property, Shifting, Modulation. Convolution Theorem, Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.
4	April, 2024	Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms, convolution theorem. Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform.

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Lesson Plan

Name of the Assistant Professor : Dr. Savita Malik

Class and Section : B.Sc (Non- Medical) & B.A 4th semester

Session : 2023-2024

Subject : Numerical Analysis

S.No	Month	Topic
1	January, 2024	Numerical Differentiation: Derivative of a function using interpolation formulae.
2	February, 2024	Eigen Value Problems: Power method, Jacobi's method, Given's method, House-Holder's method, QR method, Lanczos method.
3	March, 2024	Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eight rule, Chebychev formula, Gauss Quadrature formula.
4	April, 2024	Numerical solution of ordinary differential equations: Single step methods-Picard's method. Taylor's series method, Euler's method, Runge-Kutta methods. Multiple step methods, Predictorcorrector method, Modified Euler's method, Milne-Simpson's method.

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