Lesson Plan

Name: Dr. Anup Singh (Ext. Lecturer Mathematics)

Subject: Mathematics

Paper 1 (MMATH2.0-504: Mathematical Statistics)

Class and Section: M.Sc.-2nd Year(3rd Sem.)

Aug 2024	Unit I:	Random distribution: preliminaries, Probability density function, Probability models, Mathematical Expectation, Chebyshev's Inequality; Conditional probability, Marginal and conditional distributions, Correlation coefficient, Stochastic independence.
Sep 2024	Unit 2:	Frequency distributions: Binomial, Poissson, Gamma, Chi-square, Normal, Bivariate normal distributions. Distributions of functions: Sampling, Transformations of variables: discrete and continuous; t & F distributions; Change of variable technique; Distribution of order; Moment-generating function technique; other distributions and expectations.
Oct 2024	Unit 3:	Limiting distributions: Stochastic convergence, Moment generating function, Related theorems. Intervals: Random intervals, Confidence intervals for mean, differences of means and variance; Bayesian estimation.
Nov 2024	Unit 4:	Estimation & sufficiency: Point estimation, sufficient statistics, Rao-Blackwell Theorem, Completeness, Uniqueness, Exponential PDF, Functions of parameters; Stochastic independence.

Paper 2:(CC-3/ MCC-4 Differential Equations-1)

Class and Section: B.A/B.Sc.-2nd (3rd Sem.)

22 july-Aug 2024	Unit I:	Basic concepts and genesis of ordinary differential equations, Order and degree of a differential equation, Solutions of differential equations of first order and first degree, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p, Lagrange's equations, Clairaut's form and singular solutions.
Sep 2024	Unit 2:	Solutions of linear ordinary differential equations with constant coefficients, linear non-homogeneous differential equations. Linear differential equation of second order with variable coefficients. Method of reduction of order, method of undetermined coefficients, method of variation of parameters. Cauchy-Euler equation.
Oct 2024	Unit 3:	Genesis of 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. Lagrange's method for PDEs
Nav 2024	Unit 4:	Integral surfaces passing through a given curve. Surfaces orthogonal to a given system of surfaces. Compatible systems of first order equations. Charpit's method, Special types of first order PDEs, Jacobi's method. Second Order Partial Differential Equations with Constant Coefficients.

Lesson Plan

Name: Dr. Anup Singh (Ext. Lecturer Mathematics)
Class and Section: B.Sc.-1st (1st Sem.)
Subject: Mathematics
Paper 3:(CC – 1: Calculus)

22July-31Aug 2024	Unit I:	ε-δ definition of limit and continuity of a real valued function. Basic properties of limits, Types of discontinuities. Differentiability of functions, Application of L'Hospital rule to indeterminate forms. Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's series expansion with different forms of remainder.
Sep 2024	Unit 2:	Asymptotes: Horizontal, vertical and oblique asymptotes for algebraic curves, Asymptotes for polar curves, Intersection of a curve and its asymptotes, Curvature and radius of curvature of curves (cartesian, parametric, polar & intrinsic forms), Newton's method. Centre of curvature and circle of curvature.
Oct2024	Unit 3:	Multiple points, Node, Cusp, Conjugate point, Tests for concavity and convexity, Points of inflexion, Tracing of curves. Reduction formulae.
Nov 2024	Unit 4:	Rectification, intrinsic equation of a curve. Quadrature, Area bounded by closed curves, Volumes and surfaces of solids of revolution.

Paper 4:(MMATH1.0-404: COMPLEX ANALYSIS)
Class and Section: M.Sc.-1st (1st Sem.)

Aug 2024	Unit I:	Analytic functions; Harmonic functions; Reflection principle; Elementary functions: Exponential, Logarithmic, Trigonometric, Hyperbolic, Inverse trigonometric , Inverse hyperbolic, Complex exponents; Complex Integration: Definite integral; Contours; Branch cuts.
Sep 2024	Unit 2:	Cauchy-Goursat theorem; Simply/ multiply connected domains; Cauchy integral formula; Morera's theorem; Liouville's theorem; Fundamental theorem of algebra; Maximum modulus principle; Power series: Taylor series; Laurent series; Uniform/ absolute convergence.
Oct 2024	Unit 3:	Differentiation, integration, multiplication, division of power series; Singularities; Poles; Residues; Cauchy's residue theorem; Zeros of an analytic function; Evaluation of improper integrals; Jordan's lemma.
Nav 2024	Unit-4:	Indented paths; Integration along a branch cut; Definite integrals involving sines and cosines; Winding number of closed curve; Argument principle; Rouche's theorem; Schwarz Lemma ; Transformations: linear, bilinear (Mobius), sine, z^2, $z^{1/2}$; Mapping: Isogonal; Conformal; Scale factors; Local inverses; Harmonic conjugates.