Lesson Plans for the Academic Session 2022-2023

Name of Assistant Professor: Gaurav Saini
Teaching Subject: Mathematics

Class and Papers
1. B.A. I (Sem. 1st):   Paper II Calculus
2. B.Com I (Sem. 1st): Business Mathematics I
3. B.C.A. I (Sem. 1):   Mathematical Foundation I
4. B.A. III (Sem. V):   Paper III: Groups and Rings and Paper I: Real Analysis

Class/ month	September	October	November	December
BCA 1	Sets: Definition, Representation, operations (union, intersection, complement, difference), Venn diagrams, Practical problems. Relations: Definition, Types (Reflexive, Symmetric, transitive) Equivalence relations and classes. Partially ordered sets: Definitions and examples	Permutations: fundamental Principal of counting. nPr evaluations and meaning. Practical problems. Permutation with repetitions. Circular Permutations. Combinations: Meaning, definition, mathematical relations, numerical problems, practical problems, division into groups.	Differentation: Derivative of algebraic functions, logarithm, exponential, trigonometric, inverse trigonometric functions, higher order derivatives Formation of differential equations. Solution of differential equations $dy/dx=f(x,y)$ Exact differential equations	Linear differential equations with constant coefficients: Non homogenous and homogenous type. Class test 1 Class test 2
B.Com I	Matrix: definition, types, algebraic operations (addition, subtraction, multiplication), transpose of a matrix symmetric and skew symmetric matrices. Introduction to determinants: : Minor, cofactors, evaluations by long method	Determinants: Evaluation of determinant of a square matrix singular and non-singular matrices. Properties of determinants. adjoint of a matrix, inverse of a matrix. Solution of system of linear equations: Cramer rule and matrix methods	Introduction to logarithm: logarithm formulas and solving typical calculations with the help of logarithm Simple and compound interest: Numerical based on compound interest compounded yearly, half yearly, quarterly	Sequence: definitions and problems. A.P.: definition, problems, sum of n terms, A.Ms. G.P.: definition, problems, sum, G.Ms. Class test 1 Class test 2

Class/Months	September	October	November	December
B.A. III (Sem. V)	Group Theory: basic concepts, definition of a group, abelian group, Addition and multiplication modulo of an integers. Subgroup, order of a group, cyclic groups some important theorems. Introduction to cosets. Langrages theorem. Normal and Quotient groups. Homomorphism of groups: introduction to homomorphism, endomorphism, monomorphism isomorphism, automorphisms. Important results theorems based on these topics	Kernel of homomorphism. Center, normalizer of a group. Permutation group: S_3 and S_4 Caley Theorem. Introductions to rings: definition, ring with unity, commutative rings, zero divisors, Integral domains, division ring, fields. Characteristic of a ring Subrings: definition, theorems and examples Ideals: Definitions, Types: unit, null, principal, maximal and prime ideals (definition and examples) Quotient rings, field of quotient of an integral domain.	Homomorphism of rings, embedding rings. Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, Polynomial rings over commutative rings, Unique factorization domain (UFD) Riemann integral, Integrabililty of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus. .	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem.
BA I	Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.	Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates. Curvature, radius of curvature for Cartesian curves, parametric curves, polar curves. Newton's method. Radius of curvature for pedal curves. Tangential polar equations. Centre of curvature.	Circle of curvature. Chord of curvature, evolutes. Tests for concavity and convexity. Points of inflexion. Multiple points. Cusps, nodes & conjugate points. Type of cusps. Tracing of curves in Cartesian, parametric and polar co-ordinates. Reduction formulae. Rectification, intrinsic equations of curve. Secti	Quardrature (area) Sectorial area. Area bounded by closed curves. Volumes and surfaces of solids of revolution. Theorems of Pappu's and Guilden Class Tests.