Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar

Class and Section :   B.Sc / B.A Ist Semester

Session :   2023-2024

Subject :   Calculus

Month	Topic
August	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. Revision and Tests
September	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. Revision and Tests
October	Tracing of curves in Cartesian, parametric and polar co-ordinates. Reduction formulae. Rectification, intrinsic equations of curve. Revision and Tests
November	Quardrature (area) Sectorial area. Area bounded by closed curves. Volumes and surfaces of solids of revolution. Theorems of Pappu's and Guilden. Revision and Tests
December	University Exam

Signature of the Teacher

Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar

Class and Section :   B.Sc/B.A 3rd Semester

Session :   2023-2024

Subject :   Advanced Calculus

Month	Topic
August	Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems; Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders, Darboux intermediate value theorem for derivatives, Indeterminate forms. Revision and Tests
September	Limit and continuity of real valued functions of two variables. Partial differentiation. Total Differentials; Composite functions & implicit functions. Change of variables. Homogenous functions & Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Revision and Tests
October	Differentiability of real valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Maxima, Minima and saddle points of two variables. Lagrange's method of multipliers . Revision and Tests
November	Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae. Locus of the centre of curvature, Spherical curvature, Locus of centre of Spherical curvature, Involutes, evolutes, Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes. Revision and Tests
December	University Exam

Signature of the Teacher

Lesson Plan

Name of the Assistant Professor :　　　Dr. Parveen Kumar

Class and Section :　　　B.Sc 5th Semester

Session :　　　2023-2024

Subject :　　　Real Analysis

Month	Topic
August	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. Revision and Tests
September	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. Revision and Tests
October	Closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle . Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness. Revision and Tests
November	Bolzano-Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness, connectedness , components, continuity in relation with connectedness. Revision and Tests
December	University Exam

Signature of the Teacher

Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar & Dr. Sarita Banga

Class and Section :   B.Sc/B.A 2nd Semester

Session :   2023-2024

Subject :   Number Theory and Trigonometry

Month	Topic
January	Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithemetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophanatine equations in two variables. Complete residue system and reduced residue system modulo m. Euler's ø function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem. Revision and Tests
February	Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function [x]. 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. Revision and Tests
March	De Moivre's Theorem and its Applications. Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties. Inverse circular and hyperbolic functions and their properties. Revision and Tests
April	Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series. Revision and Tests
May	University Exam

Signature of the Teachers

Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar

Class and Section :   B.Sc/B.A 2nd Semester

Session :   2023-2024

Subject :   Vector Calculus

Month	Topic
January	Scalar and vector product of three vectors, product of four vectors. Reciprocal vectors. Vector differentiation. Scalar Valued point functions, vector valued point functions, derivative along a curve, directional derivatives. Revision and Tests
February	Gradient of a scalar point function, geometrical interpretation of grad Î¦, character of gradient as a point function. Divergence and curl of vector point function, characters of Div. f and Curl f as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator. Revision and Tests
March	Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates, Cylindrical co-ordinates and Spherical co-ordinates. Revision and Tests
April	Vector integration; Line integral, Surface integral, Volume integral. Theorems of Gauss, Green & Stokes and problems based on these theorems. Revision and Tests
May	University Exam

Signature of the Teacher

Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar

Class and Section :   B.Sc/B.A 4th Semester

Session :   2023-2024

Subject :   Sequence and Series

Month	Topic
January	Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano Weiestrass theorem, Open covers, Compact sets and Heine-Borel Theorem. Revision and Tests
February	Sequence: Real Sequences and their convergence. Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits. Revision and Tests
March	Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series. Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test, de Morgan and Bertrand's test. Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test. Alternating series. Leibnitz's test, absolute and conditional convergence. Revision and Tests
April	Arbitrary series: Abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis, re-arrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem, Pringsheim's theorem (statement only), Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products. Revision and Tests
May	University Exam

Signature of the Teacher

Lesson Plan

Name of the Assistant Professor :   Dr. Parveen Kumar

Class and Section :   B.Sc 6th Semester

Session :   2023-2024

Subject :   Real and Complex Analysis

Month	Topic
January	Jacobians, Beta and Gama functions, Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals. Revision and Tests
February	Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co- efficient. Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals. Analytic functions, Cauchy-Riemann equations. Revision and Tests
March	Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Harmonic functions. . Revision and Tests
April	Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed pints, Cross ratio, Inverse Points and critical mappings. Revision and Tests
May	University Exam

Signature of the Teacher