

LESSON PLAN (JAN-JUNE 2024)

CLASS : B.A./BSC 2nd SEM

PAPER: ALGEBRA & NUMBER THEORY

JANUARY:

Relations between the roots and coefficients of general polynomial equation in one variable, Solutions of polynomial equations having conditions on roots, Common roots and multiple roots, Transformation of equations, Nature of the roots of an equation, Descartes's rule of signs.

FEBRUARY:

Solutions of cubic equations (Cardan's method), Biquadratic equations and their solutions. Divisibility, Greatest common divisor (gcd), Least common multiple (lcm), Prime numbers, Fundamental theorem of arithmetic

MARCH:

Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices, Elementary operations on matrices, Rank of a matrix, Inverse of a matrix, Linear dependence and independence of rows and columns of matrix, Row rank and column rank of a matrix, Eigen values, Eigen vectors and characteristic equation of a matrix, Minimal polynomial of a matrix, Cayley-Hamilton theorem and its use in finding the inverse of a matrix, Unitary and orthogonal matrices

APRIL:

Linear congruences, Fermat's theorem, Euler's theorem, Wilson's theorem and its converse, Chinese Remainder theorem, Linear Diophantine equations in two variables.

NAME: Dr. Anil Saini

DESIGNATION: Associate Professor of Mathematics

LESSON PLAN (JAN-JUNE 2024)

CLASS : B.A./BSC 6th SEM

PAPER: DYNAMICS

JANUARY:

Projectile motion of a particle in a plane. Vector angular velocity.

FEBRUARY:

Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion.

MARCH:

Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy.

APRIL:

General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions.

NAME: Dr. Anil Saini

DESIGNATION: Associate Professor of Mathematics

LESSON PLAN

CLASS : B.A./BSC 5th SEM

PAPER: GROUPS & RINGS

JULY-AUGUST:

Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences, Normal subgroups

SEPTEMBER:

Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group

OCTOBER:

Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principal, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.

NOVEMBER-DECEMBER:

Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, Polynomial rings over commutative rings.

NAME: Dr. Anil Saini

DESIGNATION: Associate Professor of Mathematics

LESSON PLAN (JAN-JUNE 2024)

CLASS : B.A./BSC 6th SEM

PAPER: LINEAR ALGEBRA

JANUARY:

Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.

FEBRUARY:

Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem.

MARCH:

Algebra of Linear Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.

APRIL:

Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt, Orthogonalization process.

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LESSON PLAN (JAN-JUNE 2024)

CLASS : B.A./BSC 5th SEM

PAPER: NUMERICAL ANALYSIS

JULY-AUGUST:

Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae. Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae,

SEPTEMBER:

Central Differences: Gauss forward and Gauss's backward interpolation formulae, Sterling, Bessel Formula.

OCTOBER:

Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II. Eigen Value Problems: Power method, Jacobi's method, Given's method, House-Holder's method, QR method, Lanczos method

NOVEMBER-DECEMBER:

Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eighth rule, Chebychev formula, Gauss Quadrature formula. 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; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

NAME: Dr. Anil Saini

DESIGNATION: Associate Professor of Mathematics

LESSON PLAN (JAN-JUNE 2024)

CLASS : B.A./BSC 6th SEM

PAPER: REAL & COMPLEX ANALYSIS

JANUARY:

Jacobians, Beta and Gamma functions, Double and Triple integrals,

FEBRUARY:

Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co-efficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals.

MARCH:

Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations.

Harmonic functions.

APRIL:

Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed points, Cross ratio, Inverse Points and critical mappings.

NAME: Dr. Anil Saini

DESIGNATION: Associate Professor of Mathematics

LESSON PLAN

CLASS : B.A./BSC 1st SEM

PAPER: REAL ANALYSIS

JULY-AUGUST:

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.

SEPTEMBER:

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

OCTOBER:

Multiple points, Node, Cusp, Conjugate point, Tests for concavity and convexity, Points of inflexion, Tracing of curves, Reduction formulae

NOVEMBER-DECEMBER:

Rectification, intrinsic equation of a curve, Quadrature, Area bounded by closed curves, Volumes and surfaces of solids of revolution.

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