



GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG

**Department of Mathematics
Teaching Plan
Academic Year – 2023-24**



NAME- DR. PRACHI SINGH

CLASS – M.SC. I SEM

PAPER- I

TITLE- ADVANCED ABSTRACT ALGEBRA (I)

Month	Covered Topic	Classes	Method/Mode of Delivery
August	Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem.	06	1.Chalk and talk method 2. Flip the class
September	Solvable groups. Nilpotent groups. Field theory- Extension fields. Algebraic and transcendental extensions.	24	3.Group discussion
October	Separable and inseparable extensions. Algebraically closed fields. Perfect fields. Finite fields.	24	4.Problem Solving
November	Primitive elements. Normal extensions and splitting fields. Automorphism of extensions.	20	

Teacher

HOD

Principal



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Department of Mathematics Teaching Plan Academic Year – 2023-24



NAME – Dr. PRACHI SINGH

CLASS – M.Sc. III SEM

Paper- V

Title- Fuzzy sets and its Applications(I)

Month	Covered Topic	Classes	Method/Mode of Delivery
August	Fuzzy sets. Basic definitions. α -level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Type of fuzzy sets. The Extension principle-the Zadeh's extension Principle. Cartesian products. Algebraic products. Bounded sum and difference, t - norms and t -conorms. ,Image and inverse image of fuzzy sets.	15	1.Chalk and talk method 2. Flip the class 3.Group discussion
September	Fuzzy numbers. Elements of fuzzy arithmetic. Fuzzy Relations and Fuzzy Graphs. Fuzzy relations on fuzzy sets. Composition of fuzzy relations.	24	4.Problem Solving
October	Min-max Composition and its properties. Fuzzy equivalence. Relations. Fuzzy compatibility. Relations. Fuzzy relation equation. Fuzzy graphs. Similarity relation	24	
November	Possibility Theory. Fuzzy measures. Evidence theory.	20	
December	Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.	20	

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NAME - Dr. PRACHI SINGH

CLASS- M.SC. II SEM

PAPER- I

TITLE- ADVANCED ABSTRACT ALGEBRA (II)

Month	Covered Topic	Classes	Method/Mode of Delivery
January	Modules- Cyclic modules. Simple modules. Semi-simple modules. Schur's Lemma. Free modules. Noetherian and Artinian modules and Rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules. Primary modules.	18	1.Chalk and talk method 2. Flip the class
February	Canonical Forms - Similarity of linear transformations. Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of Nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.	18	3.Group discussion
March	Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups. Rational Canonical form. Generalized Jordan form over any field .	24	4.Problem Solving
April	Linear Transformations - Algebra of linear transformation. Singular and non-singular transformations. Characteristic roots. Matrices and linear transformations.	24	

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**Department of Mathematics
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NAME – Dr. PRACHI SINGH

CLASS – M.Sc. IV

SEM PAPER- V

TITLE- FUZZY SETS & THERE APPLICATIONS(II)

Month	Covered Topic	Classes	Method/Mode of Delivery
January	Fuzzy Logic - An overview of classical logic. Multivalued logics. Fuzzy propositions. Fuzzy Quantifiers. Linguistic variable and hedges. Inference from conditional fuzzy proposition. The compositional rule of inference.	18	1.Chalk and talk method 2.Flip the class.
February	Approximate Reasoning. An overview of fuzzy expert system. Fuzzy implications and their selection Multiconditional approximate reasoning. The role of fuzzy relation equation.	20	3.Group discussion 4.Problem Solving
March	An introduction to Fuzzy Control – Fuzzy Controllers. Fuzzy Rule base. Fuzzy Inference engine. Fuzzification. Defuzzification and various defuzzification method	24	
April	Decision Making in Fuzzy Environment-Individual decision making. Multiperson decision making. Multicriteria decision making. Multistage decision making. Fuzzy ranking methods. Fuzzy linear programming	24	

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Department of Mathematics Teaching Plan Academic Year – 2023-24



Name :- Dr. PRACHI SINGH

Class :B.Sc. I SEM

Paper- DSC

Title- CALCULUS

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
August September	I/II	Differentiability and its geometrical interpretation; Rolle's theorem, Lagrange's mean value theorem, cauchy's mean value theorem and their geometrical interpretation, Darbox's theorem. Successive differentiation and Lebnitz theorem, Maclaurin's and taylor's theorem for expansion of function	19	1.Flip the class 2.Group discussion
October	II/III	Taylor's theorem in finite form with lagrange, Cauchy and Roche-Schlomilch forms of remainder. Curvature; Aymptotes of general algebraic curves, parallel Asymptotes, asymptotes parallel to axes. Point of inflection, tangent at origin, multiple points	20	3.Problem Solving
November	III/IV	Position and nature of double points, tracing of cartesian , polar and parametric curves. Limit, continuity and first order partial derivatives, higher order partial derivatives, change of variable, Euler's theorem for homogeneous functions .Taylor's theorem ,total differentiation and jacobian	22	4.Virtual Classes
December	V	Double integration and rectangular and non rectangular regions , Double integrals in polar coordinates, Tripal integral over a parallelepiped and solid regions ,volume by tripal integrals .		

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Department of Mathematics Teaching Plan Academic Year – 2023-24



Name :- Dr. PRACHI SINGH

Class :B.Sc. I SEM

Paper- DSC

Title- CALCULUS

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
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NAME :- Dr. PRACHI SINGH

CLASS :B.SC. II SEM

PAPER- DSC

TITLE- DIFFERENTIAL EQUATION

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
JANUARY	I	Basic Concept and genesis of ordinary differential equations, order and degree of a differential equation, differential equation of first order and first degree.	19	1.Flip the class
FEBRUARY	I/II	Equations in which variables are separable, homogeneous equations, linear differential equations and equations reducible to linear form. Statement of existence and uniqueness theorem for linear differential equations, general theory of linear differential equations of second order with variable coefficients, solution of homogeneous linear ordinary differential equations of second order with constant coefficients.	20	2.Group discussion 3.Problem Solving 4.Virtual Classes
MARCH	III/IV	linearly dependent and linearly independent solutions on an Interval, Wronskian and its properties, concept of a general solution of a linear differential equation. Power series method, Bessel's equation, Bessel's function and their properties, Recurrence relations.	22	
APRIL	V	Simple harmonic motion, Velocities and acceleration along radial and transverse direction		

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Name :- Dr. PRACHI SINGH

Class :B.Sc. III SEM

Paper- DSC

Title-ABSTRACT ALGEBRA

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
August September	I/II	Definition and examples of groups, Elementary Properties of groups, Symmetric group, Abelian Group, The Dihedral groups. Modulo, its properties and examples. Subgroups and examples of subgroups, Centralizer, Normalizer, Center of a group, Product of two subgroups.	22	1.Flip the class 2.Group discussion
October	III	Cyclic groups, Properties of Cyclic groups, Normal subgroups, Cosets, Properties of Cosets, Factor groups, Lagrange's theorem.	20	3.Problem Solving
November	IV	Permutation groups, Cycle notation for permutations, Properties of Permutations, Even and odd Permutations, alternating groups. Group homomorphisms, Properties of homomorphisms	25	4.Virtual Classes
December	V	Kernel of homomorphism, Group isomorphisms, Cayley's theorem, Properties of isomorphisms, First, Second and Third isomorphism theorem for groups.		

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Name :- Dr. PRACHI SINGH

Class :B.Sc. IV SEM

Paper- DSC

Title- REAL ANALYSIS

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
JANUARY	I	Algebraic and order properties of Absolute value of a real number; Bounded above and bounded below sets, Supremum and infimum of a nonempty subset of Real number.	19	1.Flip the class
FEBRUARY	II/III	The completeness property of $\mathbb{R}$, Archimedean property, Density of rational numbers in $\mathbb{R}$, Definition and types of intervals, Nested intervals property; Neighborhood of a point in $\mathbb{R}$, Open and closed sets in real number. Convergent sequence, Limit of a sequence, Bounded sequence.	20	2.Group discussion
MARCH	III/I V	Limit theorems, Monotone sequences, Monotone convergence theorem, Subsequences, Bolzano-Weierstrass theorem for sequences, Limit superior and limit inferior for bounded sequence, Cauchy sequence, Cauchy's convergence criterion. Convergence and divergence of infinite series of real numbers, Necessary condition for convergence, Cauchy criterion for convergence; Tests for convergence of positive term series: Integral test,	29	3.Problem Solving
APRIL	V	Basic comparison test, Limit comparison test, D'Alembert's ratio test, Cauchy's n th root test. Alternating series, Leibniz test, Absolute and conditional convergence, Abel's test, Dirichlet test, Test for absolute Convergence.		4.Virtual Classes

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