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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

NAME : - AMBALIKA CHOUHAN   **CLASS :- M.Sc. I SEM**

PAPER- II   **TITLE –REAL ANALYSIS– I**

Month	Unit/ Title	Topic of lectures	No. of lecture	Method/Mode of Delivery
August September	I	Sequences and series of functions. Pointwise and uniform convergence. Cauchy criterion for uniform convergence. Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence. Uniform convergence and continuity. Uniform convergence and differentiation, Weierstrass approximation theorem.	21	1.Chalk and talk method 2. Flip the class
October	II	Power series uniqueness theorem for power series. Abel's and Tauber's theorems. Rearrangements of terms of a series. Riemann's theorem.	17	3.Group discussion
November	III	Functions of several variables linear transformations derivatives in an open subset of R^n, Chain rule, Partial derivatives, Interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem.	19	4.Problem Solving
December	IV	Extremum problems with constraints. Lagrange's multiplier method. Differentiation of integrals. Partitions of unity. Differential forms. Stoke's theorem	17	

Teacher   **HOD**   **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

NAME - AMBALIKA CHOUHAN   **CLASS - M.SC. II SEM**

PAPER- II   **TITLE- REAL ANALYSIS (II)**

Month	Covered Topic	Classes	Method/Mode of Delivery
January	Definition and existence of Riemann-Stieltjes Integral. Properties of the integral. Integration and differentiation. The fundamental theorem of calculus. Integration of Vector-valued functions. Rectifiable curves.	18	1.Chalk and talk method
February	Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of non-negative functions. The general integral. Integration of series.	18	2. Flip the class
March	Measures and outer measures, Extension of a measure. Uniqueness of extension. Completion of a measure. Measure spaces. Integration with respect to a measure. Riemann and Lebesgue Integrals	24	3.Group discussion
April	The four derivatives. Functions of bounded variation. Lebesgue differentiation theorem. Differentiation and integration. The L^p-spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of L^p. Convergence in measure. Almost uniform convergence.	24	4.Problem Solving

Teacher   **HOD**   **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

Name :- AMBALIKA CHOUHAN   **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	Taylors 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 4.Virtual Classes
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 .Taylors theorem ,total differentiation and jacobian	22	
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 .		

Teacher   **HOD**   **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

NAME :-AMBALIKA CHOUHAN **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		

Teacher **HOD** **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

Name :- AMBALIKA CHOUHAN **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.		

Teacher **HOD** **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

Name :-AMBALIKA CHOUHAN **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 R, Archimedean property, Density of rational numbers in Definition and types of intervals, Nested intervals property; Neighborhood of a point in , Open and closed sets in real number. Convergent sequence, Limit of a sequence, Bounded sequence.	20	2.Group discussion
MARCH	III/IV	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 nth root test. Alternating series, Leibniz test, Absolute and conditional convergence, Abel's test, Dirichlet test, Test for absolute Convergence.		4.Virtual Classes

Teacher **HOD** **Principal**

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

Department of Mathematics
Teaching Plan
Academic Year – 2023-24

NAME:- AMBALIKA CHOUHAN **CLASS - B.SC. III YEAR**
PAPER- II **TITLE - ABSTRACT ALGEBRA**

Month	Covered Topic	Classes	Method/ Mode of Delivery
September	Group – Automorphism, inner automorphism. Automorphism groups. Conjugacy relation.Normalizer. Counting principle and the class equation of a finite group. Center for groupsof prime order. Abelianizing of a group and its universal property. Sylow's theorems. Sylow subgroup. Structure theorem for finite abelian groups.	12	
October	Ring theory - Ring homomorphism. Ideals and Quotient rings. Field of quotients of an integraldomain. Euclidean rings. Polynomial rings. Polynomials over the rational field. Eisenstien criterion. Polynomial rings over commutative rings. Unique factorization domain. R-unique factorization domain implies so is R [$x_1,x_2.........x_n$]. Modules, submodules.	12	1.Chalk and talk method
November	Quotient modules. Homomorphism and isomorphism theorems. Definitions and examples of vector space. Subspaces. Sum and direct sum of subspaces. Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for basis.	10	2.Flip the class
December	Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.Linear transformation and their representation as matrices. The algebra of linear transformations. The rank-nullity theorem. Change of basis. Dual space, Bidual space	12	3.Group discussion
January	natural isomorphism. Adjoint of linear transformation. Eigen values and eigenvectors of a linear transformation. Diagonolisation, Annihilators of a subspace. Bilinear, Quadratic and Hermilton forms.	10	4.Problem Solving
February	Inner product spaces - Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal complements. Orthogonal normal sets and basis.	12	
March	Bessel's inequality and for finite dimensional spaces. Gram-Schmidt orthogonalization process.	09	

Teacher   **HOD**   **Principal**