

DEPARTMENT OF MATHEMATICS
LESSION PLAN
SESSION 2023-24
SEMESTER – VI

NAME OF TEACHER: HARICHARAN MAHANTA

**PAPER ALLOTTED: MTMACOR13T(METRIC SPACES AND COMPLEX ANALYSIS),
MTMADSE06T(MECHANICS)**

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR13 T(Metric Spaces and Complex Analysis)	Unit 3: Introduction to limits, Limits involving the point at infinity, continuity, Properties of complex numbers, regions in the complex plane, functions of complex variable , mappings. Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability and its related some problems.	12
April, 2024	MTMACOR13 T(Metric Spaces and Complex Analysis)	Unit 4:Introduction to Analytic functions, examples of analytic functions, exponential function, Logarithmic function, trigonometric function, derivatives of functions, and definite integrals of functions, Contour integrals and its examples, upper bounds for moduli of contour integrals, Cauchy-Goursat theorem, Cauchy integral formula and its related some problems.	12
May, 2024	MTMACOR13 T(Metric Spaces and Complex Analysis)	Unit 5: Liouville's theorem and the fundamental theorem of algebra, Convergence of sequence and series, Taylor series and its example. Unit 6:Laurent series and its examples, absolute and uniform convergence of power series and its related some priblems.	10
May, 2024	MTMACOR13 T(Metric Spaces and Complex Analysis)	Internal Examination & Class for Slow Learners	8
June, 2024		END SEMESTER EXAMINATION	
Total Classes			42

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMADSE06T (Mechanics)	Unit 1 : Co-planar forces. Astatic equilibrium. Friction. Equilibrium of a particle on a rough curve. Virtual work. Forces in three dimensions. General conditions of equilibrium. Centre of gravity for different bodies. Stable and unstable equilibrium.	16

April, 20224	MTMADSE06T (Mechanics)	Unit 2 : Equations of motion referred to a set of rotating axes. Motion of a projectile in a resisting medium. Stability of nearly circular orbits. Motion under the inverse square law. Slightly disturbed orbits. Motion of artificial satellites. Motion of a particle in three dimensions. Motion on a smooth sphere, cone, and on any surface of revolution.	16
May, 2024	MTMADSE06T (Mechanics)	Unit 3 : Degrees of freedom. Moments and products of inertia. Momental Ellipsoid. Principal axes. D'Alembert's Principle. Motion about a fixed axis. Compound pendulum. Motion of a rigid body in two dimensions under finite and impulsive forces. Conservation of momentum and energy.	12
May, 2024		Internal Examination & Class for Slow Learners	6
June, 2024		END SEMESTER EXAMINATION	
Total Classes			50

NAME OF TEACHER: DR. KUSUMIKA KUNDU

PAPER ALLOTTED: MTMADSE04T(THEORY OF EQUATIONS), MTMGDSE04T
LINEAR PROGRAMMING

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMADSE04T (Theory of Equations)	Unit 1: General properties of polynomials, Graphical representation of a polynomial, maximum and minimum values of a polynomials, General properties of equations, Descarte's rule of signs positive and negative rule, Relation between the roots and the coefficients of equations.	16
April, 20224	MTMADSE04T (Theory of Equations)	Unit 2 : : Symmetric functions. Applications of symmetric function of the roots. Transformation of equations. Solutions of reciprocal and binomial equations. Algebraic solutions of the cubic (Cardan's method) and biquadratic (Ferrari's method). Properties of the derived functions	16
May, 2024	MTMADSE04T (Theory of Equations)	Unit 3 : Symmetric functions of the roots, Newton's theorem on the sums of powers of roots, homogeneous products, limits of the roots of equations. Unit 4 : Separation of the roots of equations, Strums theorem. Applications of Strum's theorem, Conditions for reality of the roots of an equation. Solution of numerical equations.	12

May, 2024		Internal Examination& Class for Slow Learners	8
June, 2024		END SEMESTER EXAMINATION	
Total Classes			52

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMGDSE04T Linear Programming	Unit 1: Linear Programming Problems, Graphical Approach for solving some Linear Programs. Convex Sets, Supporting and Separating Hyperplanes. Theory of simplex method, optimality and unboundedness, the simplex algorithm, simplex method in tableau format, introduction to artificial variables, two-phase method, Big-M method and their comparison. Duality, formulation of the dual problem, primal- dual relationships, economic interpretation of the dual, sensitivity analysis	16
April, 2024	MTMGDSE04T Linear Programming	Unit 2 : Duality, formulation of the dual problem, primal-dual relationships, economic interpretation of the dual. Transportation problem and its mathematical formulation, northwest-corner method, least cost method ,Vogel approximation method for determination of starting basic solution , algorithm for solving transportation problem, assignment problem and its mathematical formulation, Hungarian method for solving assignment problem.	16
May, 2024	MTMGDSE04T Linear Programming	Unit 3 :: Game theory: Formulation of two person zero sum games, solving two person zero sum games, games with mixed strategies Unit 4 : graphical solution procedure, linear programming solution of games	14
May, 2024		Internal Examination& Class for Slow Learners	8
June, 2024		END SEMESTER EXAMINATION	
Total Classes			54

NAME OF TEACHER: DR. ABUL KALAM MONDAL

PAPER ALLOTTED: RING THEORY AND LINEAR ALGEBRA II (MTMACOR14T),
 BOOLEAN ALGEBRA AND AUTOMATA THEORYII (MTMADSE05T)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR14T	Unit 1 : Polynomial rings over commutative rings, division algorithm and consequences, principal ideal domains, factorization of polynomials, reducibility tests, irreducibility tests, Eisenstein criterion, and unique factorization in $\mathbb{Z}[x]$. Divisibility in integral domains, irreducible, primes, unique factorization domains, Euclidean domains.	16
April, 2024	MTMACOR14T	Unit 2 : Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators. Eigen spaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator, canonical forms.	16
May, 2024	MTMACOR14T	Unit 3 : Inner product spaces and norms, Gram-Schmidt orthogonalisation process, orthogonal complements, Bessel's inequality, the adjoint of a linear operator, Least Squares Approximation, minimal solutions to systems of linear equations, Normal and self-adjoint operators, Orthogonal projections and Spectral theorem.	12
May, 2024		Internal Examination & Class for Slow Learners	6
June, 2024		END SEMESTER EXAMINATION	
Total Classes			52

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMADSE05T	Unit 1 : Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle, lattices as ordered sets, lattices as algebraic structures, sublattices, products and homomorphisms.	8

April, 20224	MTMADSE05T	Unit 2 : Definition, examples and properties of modular and distributive lattices, Boolean algebras, Boolean polynomials, minimal and maximal forms of Boolean polynomials, Quinn-McCluskey method, Karnaugh diagrams, Logic Gates, switching circuits and applications of switching circuits.	8
May, 2024	MTMADSE05T	Unit 3 : Introduction: Alphabets, strings, and languages. Finite Automata and Regular Languages: deterministic and non-deterministic finite automata, regular expressions, regular languages and their relationship with finite automata, pumping lemma and closure properties of regular languages.	8
May, 2024		Internal Examination & Class for Slow Learners	6
June, 2024		END SEMESTER EXAMINATION	
Total Classes			30

NAME OF TEACHER: SUMITA SAHA

PAPER ALLOTTED: MTMACOR13T(METRIC SPACES AND COMPLEX ANALYSIS)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR13T (Metric Spaces and Complex Analysis)	Unit 1: Introduction to Metric space, definition and examples, open and closed balls, neighbourhood, open set, interior of a set, Limit point of a set, closed set, Diameter of a set, subspaces, dense sets, separable spaces, Sequences in Metric Spaces, Cauchy sequences, Complete Metric Spaces , Cantor's theorem and its related some problems.	12
April, 20224	MTMACOR13T (Metric Spaces and Complex Analysis)	Unit 2 :Continuous mappings, sequential criterion and other characterization of continuity, Uniform continuity, Connectedness , connected subsets of R and its related some problems.	10
May, 2024	MTMACOR13T (Metric Spaces and Complex Analysis)	Unit 2 :Introduction to compactness, sequential compactness, Heine-Borelproperty , Totally bounded spaces, finite intersection property and continuous functions on compact sets. Homeomorphism, Contraction mappings, Banach Fixed point Theorem and its application to ordinary differential equation.	10
May, 2024	MTMACOR13T (Metric Spaces and Complex Analysis)	Internal Examination & Class for Slow Learners	6
June, 2024		END SEMESTER EXAMINATION	
Total Classes			38

