

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

NAME OF TEACHER: HARICHARAN MAHANTA

PAPER ALLOTTED: MTMGCOR04T(ALGEBRA)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMGCOR4T (Algebra)	Equivalence relations and partitions, Functions, Composition of functions, Invertible functions, One to one correspondence and cardinality of a set. Definition and examples of groups, examples of abelian and nonabelian groups, the group Z_n of integers under addition modulo n and the group $U(n)$ of units under multiplication modulo n . Cyclic groups from number systems, complex roots of unity, circle group, the general linear group $GL_n(n,R)$,	16
April, 2024	MTMGCOR4T (Algebra)	groups of symmetries of (i) an isosceles triangle, (ii) an equilateral triangle, (iii) a rectangle, and (iv) a square, the permutation group $Sym(n)$, Group of quaternions. Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset and the commutator subgroup of group, examples of subgroups including the center of a group. Cosets, Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups: their definition, examples, and characterizations, Quotient groups.	16
May, 2024	MTMGCOR4T(Algebra)	Definition and examples of rings, examples of commutative and non-commutative rings: rings from number systems, Z_n the ring of integers modulo n , ring of real quaternions, rings of matrices, polynomial rings, and rings of continuous functions. Subrings and ideals, Integral domains and fields, examples of fields: Z_p , Q , R , and C . Field of rational functions.	16
June, 2024		Internal Examination & Class for Slow Learners	
July 2024		END SEMESTER EXAMINATION	
Total Classes			48

NAME OF TEACHER: DR. KUSUMIKA KUNDU

PAPER ALLOTTED: MTMACOR09T(MULTIVARIATE CALCULUS)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR09T (Multivariate Calculus)	Unit-1 : Functions of several variables, limit and continuity of functions of two or more variables Partial differentiation, total differentiability and differentiability, sufficient condition for differentiability. Chain rule for one and two independent parameters, directional derivatives, the gradient, maximal and normal property of gradient, tangent planes	16
April, 20224	MTMACOR09T (Multivariate Calculus)	Unit-1: Extrema of functions of two variables, method of Lagrange multipliers, constrained optimization problems. Unit-2: Double integration over rectangular region, double integration over non-rectangular region, Double integrals in polar co-ordinates, Triple integrals, Triple integral over a parallelepiped and solid regions. Volume by triple integrals, cylindrical and spherical coordinates. Change of variables in double integrals and triple integral Unit-4: Interpolation: Lagrange and Newton's methods, Error bounds, Finite difference operators. Gregory forward and backward difference interpolations. Numerical differentiation: Methods based on interpolations, methods based on finite differences	16
May, 2024	MTMACOR09T (Multivariate Calculus)	Unit – 3 : : Definition of vector field, divergence and curl. Line integrals, Applications of line integrals: Mass and Work. Fundamental theorem for line integrals, conservative vector fields, independence of path. Unit – 4: Green's theorem, surface integrals, integrals over parametrically defined surfaces. Stoke's theorem, The Divergence theorem.	14
June, 2024	MTMACOR09T (Multivariate Calculus)	Internal Examination & Class for Slow Learners	8
July 2024		End Semester Examination	
Total Classes			54

NAME OF TEACHER: DR. ABUL KALAM MONDAL

PAPER ALLOTTED: RING THEORY AND LINEAR ALGEBRA I (MTMACOR10T)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR10T	Unit 1: Definition and examples of rings, properties of rings, subrings, integral domains and fields, characteristic of a ring. Ideal, ideal generated by a subset of a ring, factor rings, operations on ideals, prime and maximal ideals.	16
April, 2024	MTMACOR10T	Unit 2 : Ring homomorphisms, properties of ring homomorphisms. Isomorphism theorems I, II and III, field of quotients. Unit 3 : Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces.	16
May, 2024	MTMACOR10T	Unit 4 : Introduction to linear transformations, Subspaces, dimension of subspaces, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations. Isomorphisms. Isomorphism theorems, invertibility and isomorphisms, change of coordinate matrix.	16
June, 2024		Internal Examination & Class for Slow Learners	6
July, 2024		END SEMESTER EXAMINATION	
Total Classes			54

NAME OF TEACHER: SUMITA SAHA

PAPER ALLOTTED: MTMACOR08T(RIEMANN INTEGRATION AND SERIES OF FUNCTIONS), MTMSSEC02M(LOGIC AND SETS)

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMACOR08T (Riemann Integration and Series of functions)	Unit-1 : Introduction to Riemann integral, inequalities of upper and lower sums, Darboux integration, Darboux theorem, Riemann conditions of integrability, Riemann sum and definition of Riemann integral through Riemann sums , equivalence of two definitions and some related	16

		problems. Riemann integrability of monotone and continuous functions, Properties of the Riemann integral, definition and integrability of piecewise continuous and monotone functions. Intermediate Value theorem for Integrals, Fundamental theorem of Integral Calculus and some related problems.	
April, 2024	MTMACOR08T(Riemann Integration and Series of functions)	Unit-2: Introduction to Improper integrals, Convergence of Beta and Gamma functions. Unit-3: Introduction to point-wise and uniform convergence of sequence of functions. Theorem on continuity, derivability and integrability of the limit function of a sequence of functions, Series of functions, Theorems on the continuity and derivability of the sum function of a series of functions; Cauchy criterion for uniform convergence and Weierstrass M-test and some related problems.	16
May, 2024	MTMACOR08T(Riemann Integration and Series of functions)	Unit-4: Introduction to Fourier series, definition of Fourier coefficients and series and related some problems. Riemann Lebesgue lemma, Bessel's inequality, Parseval's identity, Dirichlet's condition Examples of Fourier expansions and summation result for series. Unit 5: Introduction of Power series, radius of convergence, Cauchy Hadamard Theorem, Differentiation and integration of power series, Abel's Theorem, Weierstrass Approximation Theorem and some related some problems.	16
June, 2024	MTMACOR08T(Riemann Integration and Series of functions)	Internal Examination & Class for Slow Learners	8
July, 2024		End Semester Examination	
Total Classes			56

Month	Paper	Topic	No of classes
March, 2024 (02.03.2024)	MTMSSEC02M(Logic and Sets)	Unit-1: Introduction to proposition, truth table, negation, conjunction and disjunction. Implication, biconditional propositions, converse, contrapositive and inverse propositions with examples and precedence of logical operators and some related examples. : Propositional equivalence, Logical equivalence, Predicates and quantifiers, Introduction to quantifiers, Binding variables and Negations with examples and its related some problems.	16

April, 2024	MTMSSEC02M(Logic and Sets)	Unit-2 :Introduction to sets, subsets, Set operations and the laws of set theory and venn diagrams. Examples of finite and infinite sets, Finite sets and counting principle. Empty set, properties of empty set. Standard set operations, Classes of sets, Power set of a set and its related some problems.	14
May, 2024	MTMSSEC02M(Logic and Sets)	Unit-3: Introduction to difference and symmetric difference of two sets, Set identities, Generalized union and intersections and also this topics related some problems. Introduction to Relation, Product set, Composition of relations, Types of relations, Partitions, Equivalence Relations with examples of congruence modulo relation, Partial ordering relations relations, n-ary relations with examples and also solution of this topic related some problems.	16
June, 2024	MTMSSEC02M(Logic and Sets)	Practices & Class for Slow Learners	8
July, 2024		End Semester Examination	
		Total Classes	48