Academic Calendar Department of Mathematics (24-25)

Department of Mathematics

Subject: MTMG

Month: August 2024-January 2025 Session-2024-2025

Sl No	Hons/Gen	Paper	Group	Topic	No. of Lecture	Name of the Lecture		No. Class Taken
1.	Gen	1st Sem		Algebra				
				Classical Algebra	1	Concept of Complex numbers		
					3	Demoivre's Theorem and its Application		
					2	Trigonometric, Exponential and Logarithmic functions and Inverse circular functions		
					1	Class Test		
					3	Relation between roots and coefficients		
					2	Transformation of equations		
					2	Reciprocal and binomial equations and their properties.		

					2	Descatres' rule of sign		
					2	Cardan's Method of Syllabus		
					2	Ferrari's method of Solutions of bi-quadratic equations		
					1	Class Test		
					2	Inequalities related to AM>= G.M.>= H.M. and application		
					2	Cauchy's inequality and applications		
					2	m-th power theorem and applications		
					1	Class Test		
				Abstract Algebra	2	Equivalence relation and partitions		
					2	Concept of functions		
					2	Permutation, Inversion, cycles and transpositions		
					1	Class Test		
					1	Concepts of groups		

					2	Abelian, non-abelian, groups, Groups under the addition of integer modulo n, Symmetric group, permutation group, General linear group GL(n,R)		
					2	Subgroups		
					1	Cyclic Groups		
					1	Class Test		
					1	Cosets		
					1	Lagrange's Theorem and applications		
					1	Order of an element		
					2	Normal Subgropus and its characterisation		
					1	Class Test		
					2	Concepts of Ring and its example		
					1	Division Ring, Integral Domains, Skew-fields		
					2	Concept of Field and Sub-fileds and properties		
				Linear Algebra	1	Concept of matrices and its algebraic properties		
					2	Hermitian , Skew-Hermitian, Orthogonal matrices and their properties		

					2	Determinants and its properties		
					2	Inverse of a matrix, Cramer's rule		
					1	Class Test		
					2	Concept of vector space		
					1	Linearly dependent and independent vectors		
					2	Basis and dimension and related properties		
					2	Linear transformation and its matrix representation		
					2	Rank and nullity		
					1	Solution of a system of equation		
					2	Eigen Vales and Eigen Vectors,		
					1	Diagonalisation of matrices		
					1	Characteristics of polynomial of a matrix and Cayley- Hamilton theorem		
					1	Bilinear forms, real quadratic forms, Sylvester's law of inertia, positive definiteness		

					1	Class Test		
Subject: MDC Mathematics								
Month: August 2024-January 2025						Session-2024-2025		
	Hons	Sem 2		**Basic Mathematics**				
				Sets, Relation and Mapping	2	Concepts of sets , operations		
					2	Relations		
					2	Functions and its properties		
				Probability and Statistics	1	Concept of Events and probability		
					4	Random Variables and probability distribution		
					3	Expectation		
					3	Central tendency		
					2	Standard Deviation and Variance		
				Matrix and Determinants	1	Concepts of Matrices		

					1	Types of Matrices		
					2	Elementary row operation and related properties		
					1	Inverse of matrices		
					3	Concept of determinants and its properties		
					2	Solution of a system of equations		
				Eigen Vales and Eigen Vectors	3	Concepts of Eigen Values		
					5	Eigen Vectors and Eigen Spaces related to a matrix		
					1	Characteristic polynomial of a mstrix		
					2	Caley-Hamilton Theorem and its application		
					2	Bilinear forms		
					4	Real Quadratic forms and Positive Definiteness		
2.	Gen	Sem 3				Coming Soon…..		

3.	Gen	Sem 5		Matrices				
					5	R, R2, R3 as vector spaces over R		
					5	Basis and Dimension		
					5	Concept of Linear Independence and examples of different bases		
					5	Subspaces of R2, R3		
					1	Class test		
					5	Translation, Dilation, Rotation, Reflection in a point, line and plane		
					4	Matrix form of basic geometric transformations.		
					5	Interpretation of eigen values and eigen vectors		
					4	Eigen spaces		

					1	Class Test		
					4	Types of matrices		
					5	Rank of a matrix		
					4	Invariance of rank under elementary transformations.		
					4	Reduction to normal form,		
					5	Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns upto four variables		
					1	Class Test		
					1	Matrices in diagonal form		
					5	Reduction to diagonal form upto matrices of order 3		
					5	Computation of matrix inverses using elementary row operations		
					5	Rank of matrix		
					5	Solutions of a system of linear equations using matrices.		

					5	Illustrative examples of above concepts from Geometry, Physics, Chemistry, Combinatorics and Statistics.		
					1	Class Test		
	Month: February 2024- June 2025							
4	Gen	Sem 2		Calculus				
				Limit, Continuity and Differentiation	5	Concept of Limit		
					2	Problems-Solutions		
					1	Class test		
					6	Continuity and discontinuity		
					3	Problems- Solutions		
					1	Class test		

					5	Concept of Limit		
					2	Problems-Solutions		
					1	Class test		
					6	Continuity and discontinuity		
					3	Problems- Solutions		
					1	Class test		
					5	Concept of Limit		
					2	Problems-Solutions		
					1	Class test		
					6	Continuity and discontinuity		
					3	Problems- Solutions		
					1	Class test		
					6	Differentiation		
					2	Problems-Solutions		

					1	Successive Differentiation		
					2	Leibnitz Theorem and its application		
					1	Problem Solutions		
					4	Partial Differentiations		
					2	Euler's Theorem		
					4	Problem Solutions		
					1	Class test		
				Application	2	Tangents and Normals		
					2	Problems-Solutions		
					1	Curvatures		
					2	Problems-Solutions		
					2	Asymptotes		
					2	Problems-Solutions		
					1	Singular Points		

					2	Problems-Solutions		
					5	Tracing of curves		
					3	problem solution on Tracing of curves		
					1	Class Test		
				Mean Value Theorem	1	Role's Theorem		
					1	Problems-Solutions		
					5	Mean Value Theorem		
					3	Problems-Solutions		
					2	Taylors Theorem		
					1	Maclaurin's Theorem		
					3	Maclaurin's Series		
					2	Problems-Solutions		
					4	Maximum and Minimum		

					2	Problems-Solutions		
5	Gen	Sem 4		Group Theory				
					8	Equivalence relations and partitions, Functions		
					1	Composition of functions		
					1	Invertible functions		
					5	One to one correspondence and cardinality of a set		
					5	Definition and examples of groups, examples of abelian and nonabelian groups, the group Zn of integers under addition modulo n and the group U(n) of units under multiplication modulo n.		
					3	the general linear group GLn(n,R), 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.		

					6	Cyclic groups from number systems, complex roots of unity, circle group		
					1	Class Test		
					8	Subgroups		
					3	cyclic subgroups		
					3	the concept of a subgroup generated by a subset and the commutator subgroup of group, examples of subgroups including the center of a group.		
					5	Cosets, Index of subgroup, Lagrange's theorem		
					2	order of an element		
					6	Normal subgroups: their definition, examples, and characterizations		
					3	Quotient groups		
					1	Class Test		

					12	Definition and examples of rings, examples of commutative and non-commutative rings: rings from number systems, Zn the ring of integers modulo n, ring of real quaternions, rings of matrices, polynomial rings, and rings of continuous functions		
					5	Subrings and ideals		
					12	Integral domains and fields, examples of fields: Zp, Q, R, and C. Field of rational functions.		
					1	Class Test		

Sl No	Hons/Gen	Paper	Group	Topic	No. of Lecture	Name of the Lecture	Class Taken
1.	Gen	6th Sem		Linear Programming			
				Linear Programming Problem and Graphysical Solution	2	Concept of LPP and Historical Background	
					2	Standard form of LPP and Matrix Representation	
					2	Formation of LPP	

					3	Problem Solution on LPP formation	
					5	Graphical approach of solving LPP: Bounded and Unbounded problems	
					1	Class Test	
				Vector and Convex Set	2	Concept of vectors	
					2	Concept of points, line and planes in n-dimensional euclidean space	
					2	Hyperplane	
					2	Linear Combination of vectors	
					2	Linear dependence and independence of vectors	
					2	Basis of a vector space	
					5	Convex combination and Convex sets	
					3	Convex Polyhedron and Convex hull	
					2	Separating Hyperplane and Supporting hyperplane	

					2	Extreme Points	
					1	Class Test	
				Simplex Method of solution	3	General Linear Programming Problem: Objective function, Constraints and Non-negativity condition.	
					2	concept of slack and surplus variables	
					2	Feasible solution, Basic solution, Degenerate solution, Basic feasible solution.	
					3	Characteristics of solutions on an LPP	
					3	Reduction of a feasible solution to a basic feasible solution.	
					2	Optimal solution and unbounded solution	
					5	Simplex Algorithm and solution by general simplex method	
					4	Concept of artificial variable and solution of LPP by Big M method.	
					5	Solution of LPP by Two Phase Method.	
					1	Class test	

				Duality Theory	3	Concept of Duality	
					1	Algorithm of Dual problem	
					5	Conversion of Primal to Dual	
					3	Primal-Dual relationship	
					2	Economical interpretation of Dual	
					5	Dual Simplex method	
					1	Class Test	