PROGRAMME OUTCOMES AND COURSE OUTCOMES

2023 – 2024

Name of the Programme: M.Sc MATHEMATICS **PROGRAMME CODE: PSMA**

Programme Outcomes:

PO1	Apply acquired scientific knowledge to solve major and complex issues in the society/industry.
PO2	Attain research skills to solve complex cultural, societal and environmental issues.
PO3	Employ latest and updated tools and technologies to solve complex issues.
PO4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

Course Outcomes:

Course Code	Course Title	Course Outcomes
23PG1M1	Algebraic Structures	CO1: Recall basic counting principle CO2:Define Solvable groups, define direct products CO3:Define similar Transformations. CO4:Define Jordan, canonical form, Jordan block. C05: Define trace, define transpose of a matrix
23PG1M2	Real Analysis-I	CO1: Describe analysis concepts in Functions of bounded variation and Infinite series. CO2: Explain concepts of Reimann Steljes Integral. CO3: Describe the theorems on Reimann Steljes Integral. CO4: Describe Infinite products. CO5: Describe sequences of functions.
23PG1M3	Ordinary Differential Equations	CO1: Establish the qualitative behavior of solutions of systems of differential equations. CO2: Recognize the physical phenomena modeled by differential equations and dynamical systems.

		CO3: Analyze solutions using appropriate methods and give examples. CO4: Formulate Green's function for boundary value problems. CO5: Understand and use various theoretical ideas and results that underlie the mathematics in this course.
23PG1ME1/23PG1ME2	Number Theory/Integral Transforms	CO1: Define and interpret the concepts of divisibility. CO2: Explain properties of congruences. CO3: Apply the Law of Quadratic Reciprocity. CO4: Classify functions of number theory. CO5: Solve Linear Diophantine equation.
23PG1ME3/23PG1ME4	Fuzzy Sets and its Applications/Differential Geometry	CO1: Distinguish crisp sets and Fuzzy sets. CO2: Classify operators on Fuzzy sets. CO3: Describe Fuzzy relations. CO4: Describe Fuzzy Measures. CO5: Apply Fuzzy sets in real life situations.
23PG1MAE	Linear Programming	CO1: Formulate linear programming problems CO2: Solve linear programming problems by graphicalMethod.

		CO3: Describe feasible Solution, basic feasible solution,optimum basic feasible solution and degeneratesolution. CO4: Describe simplex method to solve linear programming problems. CO5: Solve problems in decision making.
23PG2M4	Advanced Algebra	CO1: Appraise characteristic roots of lineartransformations CO2: Explain Matrices and Nilpotent transformation. CO3: Classify transformations. CO4: Describe various concepts of fields. CO5: Describe various concepts of fields.
23PG2M5	Real Analysis-II	CO1: Identify Riemann Integral and Riemann – Stieltjes Integral. CO2: Explain Uniform convergence of functions. CO3: Define Power Series and Logarithmic Functions. CO4: Define Fourier Series and Gamma Function. CO5: Describe Linear Transformations and ExplainInverse function theorem.
23PG2M6	Mechanics	CO1: Describe the behaviour of a particle, the system of particles and D'Alambert's principle. CO2: Solve problems using Lagrangian formulation.

		CO3: Explain Hamilton's principle in Physical reality. CO4: Construct Lagrange's equation for non - holonomic system. CO5: Apply the laws of forces in central orbit to solve Kepler's problem.
23PG2ME5/23PG2ME6	Mathematical Statistics/Statistical Methods	CO1: Classify discrete and continuous distributions. CO2: Describe t, F and limiting distributions. CO3: Summarize maximum likelihood methods. CO4: Describe the measures of quality estimators. CO5: Distinguish tests of hypothesis.
23PG2ME7/23PG2ME8	Graph Theory/Numerical Analysis	CO1: Build the knowledge of Connectivity in graphs. CO2: Identify Eulerian and Hamiltonian graphs. CO3: Explain Digraphs in graphs. CO4: Describe Planarity and Matchings in graphs. CO5: Define and Explain Domination in graph.
23PG2MSE1	Optimization Methods	CO1: Distinguish Transportation problem and Assignment Problem. CO2: Classify the methods of finding IBFS to a transportation problem. CO3: Explain assignment problem and solve.

		CO4: Solve Sequencing problem. CO5: Define two person zero sum game, saddle point and solve problems.
22PG3M9	Measure and Integration	CO1: Explain Lebesgue measurable sets andMeasurability. CO2: Explain measurable functions. CO3: Classify Riemann and Lebesgue Integrals. CO4: Describe Abstract measure spaces. CO5: Define Signed Measures and distinguish HahnDecomposition and Jorden Decomposition.
19PG3M10	Optimization Techniques	CO1: Explain revised simplex method and solve problems. CO2: Classify integer programming problem and explaincutting plane and branch and bound methods. CO3: Recognize dynamic programming problem and formulate recurrence relation. CO4: Distinguish inventory control models. CO5: Distinguish inventory control models.
19PG3M11	Combinatorics	CO1: Explain the rules of sum and product of permutations and combinations. CO2: Describe distributions of distinct objects into non-distinct cells and

		partitions of integers. CO3: Identify solutions by the technique of generating functions and recurrence relations with two indices. CO4: Solve problems on principle of inclusion and Exclusion. CO5: Apply Polya's theory using configuration.
19PG3M12	Topology	CO1: Classify various Topologies in Topological spaces. CO2: Explain connectedness and Components in Topological spaces. CO3: Describe compactness in Topological spaces. CO4: Identify Seperation axioms. CO5: Explain Urysohn Metrization theorem.
21PG3ME1/2 1PG3ME2	Fuzzy sets and Applications/ Numerical Analysis	CO1: Crisp sets and Fuzzy Distinguish sets. CO2: Classify operators on Fuzzy sets. CO3: Describe Fuzzy relations. CO4: Describe Fuzzy Measures. CO5: Apply Fuzzy sets in real life situations.
19PG4M13	Complex Analysis	CO1: Identify continuous, differentiable and analytic Functions. CO2: Explain Cauchy's theorem for rectangle and Cauchy's integral

		formula. CO3: Summarize the conditions for a complex variable to be Harmonic. CO4: Compute analytic functions in series form. CO5: Identify the conditions for a function to be elliptic and bring out its properties.
19PG4M14	Statistics	CO1: Classify discrete and continuous distributions. CO2: Describe t, F and limiting distributions. CO3: Explain statistical tests. CO4: Summarize maximum likelihood methods. CO5: Distinguish tests of hypothesis.
19PG4M15	Methods of Applied Mathematics	CO1: Explain Eulers equation and its applications. CO2: Solve variational problems. CO3: Distinguish Integral equations. CO4: Describe various methods for solving integral Equations. CO5: Solving problems using fourier transforms.
19PG4M16	Functional Analysis	CO1: Create knowledge with the basic concepts,principles and methods of functional analysis and its applications. CO2: Analyze the concept of normed spaces, Banach spaces, and the

		theory of linear operators. CO3: Explain in detail the Hahn-Banach theorem, the open mapping and closed graph theorems. CO4: Define and thoroughly explain Hilbert spaces and self-adjoint operators. CO5: Discuss in detail the study of the spectrum of an operator and its properties.
19PG4ME3/19PG4ME4	Formal Languages/ Algebraic Graph Theory	CO1: Design the basic concepts in automata theory andformal languages. CO2: Identify different formal language classes and theirRelationships. CO3: Transform between equivalent deterministic andnon-deterministic finite automata, and regular expressions. CO4: Discuss about the automata, regular expressionsand context-free grammars accepting or generating a certain language. CO5: Simplify the theorems in automata theory using its properties.
19PGSLM1	Problems in Advanced Mathematics	CO1: Solve problems in Real Analysis. CO2: Solve problems in Complex Analysis. CO3: Solve problems in Algebra. CO4: Solve problems in Linear Algebra.

		CO5: Solve problems in Differential Equations.
21PG2SLLM1	Verbal And Numerical Aptitude For National Examinations	CO1: enhance the teaching and research quality of Aspirants. CO2: Develop the cognitive and creative thinking ability. CO3: Develop reasoning techniques. CO4: Evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information. CO5: Identify analogy and solve problems on data Interpretation.