M.Sc. MATHEMATICS

PROGRAMME OUTCOMES

PO1	Apply domain based knowledge to real life situations.
PO2	Acquire strong communication skills to function effectively in a diverse social atmosphere.
PO3	Adopt environmental values to enable sustainable living in the world.

POST GRADUATE PROGRAMME SPECIFIC OUTCOMES

	After the completion of the programme, the students will be able to:
PSO1	Evaluate hypothesis, theories, methods and evidence within their proper contexts.
PSO2	Use the concepts and theories of mathematics and their application in the real world to an advanced level in a systematic manner.
PSO3	Prepare for research studies in Mathematics & related fields and enhance career prospects in a huge array of fields.

M.Sc. Course Outcomes

Sl. No	Name of the Paper	Course Outcomes
		After the completion of the course, the students will be able:
1	**SEMESTER I** ME010101: Abstract Algebra	**CO1 :** To analyze fundamental homomorphism theorem and group action on a set. **CO2 :** To apply isomorphism theorems and Sylow theorems. **CO3 :** To demonstrate the knowledge of factorization of polynomials over a field, ring homomorphism, quotient rings, prime and maximal ideals.
2	**SEMESTER I** ME010102: Linear Algebra	**CO1 :** To illustrate basic concepts of vector spaces and the properties of determinant function. **CO2 :** To differentiate different linear transformations, their algebra and representation of transformations by matrices. **CO3 :** To implement the ideas of canonical forms, characteristic values and annihilating polynomials.
3	**SEMESTER I** ME010103: Basic Topology	**CO1 :** To analyse the concept of topological spaces, base and subbase. **CO2 :** To apply the concept of continuity , quotient spaces and connectedness on different topologies. **CO3 :** To differentiate levels of spaces based on axioms.

4	**SEMESTER I** ME010104: Real Analysis	**CO1 :** To explain theorems associated with bounded variation and rectifiable curves. **CO2 :** To acquire the idea about Riemann-Stieltjes integral and the concept of uniform convergence. **CO3 :** To acquire the idea about special functions.
5	**SEMESTER I** ME010105: Graph Theory	**CO1 :** To discuss about basic concepts of graph theory **CO2 :** To use the application of trees in everyday problems. **CO3 :** To practice problems on Eulerian and Hamiltonian graphs, graph coloring and planarity of graph.
6	**SEMESTER II** ME010201: Advanced Abstract Algebra	**CO1 :**.To explain the properties of finite fields. **CO2 :** To apply the concepts of UFD, ED and field automorphisms **CO3 :** To describe Galois group and Galois theory.
7	**SEMESTER II** ME010202: Advanced Topology	**CO1 :** To explain Urysohn characterization of normality, Tietze characterization of normality, products and co-products. **CO2 :** To analyse embedding lemma, Tychonoff embedding and metrization theorem. **CO3 :** To develop the idea of convergence of nets, compactness and variations of compactness.
8	**SEMESTER II** ME010203: Numerical analysis with Python 3	**CO1 :** To develop basic python programming involving symbolic mathematical operations. **CO2 :** To interpret the concepts of Gaussian elimination, interpolation, curve fitting and finding roots of equations using python programme. **CO3 :** To illustrate the concept of numerical integration using python.
9	**SEMESTER II** ME010204: Complex Analysis	**CO1 :** To explain spherical representation of complex plane and elementary properties of analytic functions. **CO2 :** To analyse power series representation of analytic functions. **CO3 :** To examine the concept of singularities and residues.
10	**SEMESTER II** ME010205: Measure Theory and Integration	**CO1 :** To use knowledge about Lebesgue measure and Lebesgue measurable functions. **CO2:**To describe general measurable space and measurable functions. **CO3:** To apply integration over general measurable space and product measure

11	**SEMESTER III** ME010301: Advanced Complex Analysis	**CO1 :** To apply the concept of harmonic and subharmonic functions. **CO2 :** To explain Weierstrass's theorem, Gamma function, Hadamard's theorem, Riemann zeta function and normal families. **CO3 :**To illustrate Riemann mapping theorem and Weierstrass's theory.
12	**SEMESTER III** ME010302: Partial Differential Equations	**CO1 :** To apply various analytic methods for computing solutions of various PDEs and studying their behavior. **CO2 :** To determine integral surfaces passing through a curve, characteristic curves of second order PDE and compatible systems. **CO3 :** To analyse behavior of solutions of PDEs using technique of separation of variables.
13	**SEMESTER III** ME010303: Multivariate Calculus and Integral Transforms	**CO1 :** To acquire the concepts of integral transforms convolutions and multivariable differential calculus.. **CO2 :** To discuss implicit functions and extremum problems. **CO3 :** To explain integration of differential forms.
14	**SEMESTER III** ME010304: Functional Analysis	**CO1 :** To acquire the concepts of normed spaces, properties of normed space,linear operators on finite dimensional spaces and dual space. **CO2 :** To illustrate inner product spaces and properties of orthonormal sequences using examples and theorems. **CO3 :** To demonstrate different forms of Hahn-Banach Theorems.
15	**SEMESTER III** ME010305: Optimization Techniques	**CO1 :** To determine solutions to linear programming problems and integer programming problems using different methods. **CO2 :** To analyse the concepts of flow and potential in networks and goal programming. **CO3 :** To discuss different methods for solving non-linear programming problems.
16	**SEMESTER IV** ME010401: Spectral Theory	**CO1 :** To distinguish different forms of convergence of operators and open mapping theorem. **CO2 :** To apply the concept of Banach fixed point theorem and properties of resolvent and spectrum. **CO3 :** To discuss properties of compact linear operators, bounded self adjoint linear operators, positive operators and properties of projections.
17	**SEMESTER IV** ME010402: Analytic Number Theory	**CO1 :** To apply the properties of arithmetical functions for solving problems. **CO2 :** To acquire the knowledge about the theory of prime numbers. **CO3 :** To utilize the concepts of congruences, Chinese remainder theorem, Euler's theorem, Wilson's theorem and Legendre's symbol.

18	**SEMESTER IV** ME800401 (Elective): Differential Geometry	**CO1 :** To interpret the ideas of graphs and level sets, vector fields, the tangent space and vector fields on surfaces and orientation. **CO2 :** To summarize the fundamentals of Gauss map, geodesics and parallel transport. **CO3 :** To describe the ideas of Weingarten map, curvature of plane curves and line integrals,curvature of surfaces and parametrized surfaces.
19	**SEMESTER IV** ME800402 (Elective): Algorithmic Graph Theory	**CO1 :** To implement basic concepts of graphs using algorithms. **CO2 :** To establish the max-flow min-cut algorithm and Menger's theorem for finding connectivity. **CO3 :** To examine algorithms for finding maximum matching in bipartite graphs, factorizations and block designs.
20	**SEMESTER IV** ME800403 (Elective): Combinatorics	**CO1:** To apply the concepts of permutation, combinations problems,pigeonhole principle and Ramsey numbers. **CO2:** To use principles of inclusion and exclusion for solving problems. **CO3:** To compute generating functions and recurrence relations.
21	**SEMESTER IV** ME010403 & ME010104: Dissertation and Viva-voce	**CO1 :** To deduce their arguments in a comprehensible and scholarly manner. **CO2 :** To develop the spirit of research in their mind. **CO3 :** To validate scientific integrity.