Programme :M.Sc Mathematics

Course Outcomes of the Course "Algebra I"

CO1. Generalize the concept of addition and multiplication of numbers to define a binary operation on an arbitrary set
CO2. Define a group and describe some basic properties of groups
CO3. Explain various types of groups
CO4. Describe the product Groups and Homomorphisms
CO5. Define a factor group
CO6. Describe a group action on a set
CO7. Classify finite groups using Sylow Theorems
CO8. Describe Isometries of a Plane
CO9. Describe basics of Rings and Fields

Course Outcomes of the Course "Linear Algebra I"

CO1. Describe basics of matrices and basics of matrix operations
CO2. Analyze e some properties and applications of determinant
CO3. Describe basic concepts of Vector Spaces
CO4. Describe one to one correspondence between finite dimensional real vector spaces and column matrices with real entries
CO5. Describe some properties of Linear Transformations of real vector spaces
CO6. Understand the relation between linear transformations and matrices
CO7. Describe some applications of Linear Operators

Course Outcomes of the Course "Real Analysis I"

CO1. Define some basics of real and complex number system
CO2. Generalizing the order in Real line to define an ordered field
CO3. Describe the concept of countability and uncountability
CO4. Generalize the concept of distance in space to define metric on an arbitrary set
CO5. Describe some basics of Sequences and Series
CO6. Define Compactness and Connectedness of a set in a metric space
CO7. Describe the concept of Limit of a function
CO8. Demonstrate some basics of Continuity and Differentiability of a function

Course Outcomes of the Course "Numerical Analysis"

CO1. Describe the concept of Iteration in finding a zero of a Polynomial
CO2. Find the zeros of Polynomials by using various iterative methods
CO3. Analyze the meaning of rate of convergence of an iterative method and hence compare various methods with one another
CO4. Solve systems of linear equations by direct and some iterative methods
CO5. Find the Eigen values and Eigen vectors of a matrix using iteration
CO6. Describe the meaning of interpolation
CO7. Describe various methods of interpolation
CO8. Describe the concept of Numerical differentiation and Numerical integration

Course Outcomes of the Course "Number Theory"

CO1. Describe the basic properties of divisibility in the set of integers
CO2. Solve Linear Diophantine Equations
CO3. Describe some basic properties of primes
CO4. Describe some properties of Euler's function
CO5. Explain the concept of congruences and Residue classes
CO6. Solve linear congruences
CO7. Explain the concept of Quadratic residues
CO8. Explain Fermat's Last theorem

Course Outcomes of the Course "Discrete Mathematics and Applications"

CO1. Explain the basic properties of divisibility in the set of integers
CO2. Solve congruences
CO3. Explain some basic principles of counting
CO4. Solving Linear Recurrence Relations
CO5. Describe the concept of Relations and partial orders on a set
CO6. Explain the concept of Boolean Algebra
CO7. Describe some basic concept of groups
CO8. Explain some basic concepts of Coding Theory

Course Outcomes of the Course "Algebra II"

CO1. Classify integral domains by generalizing various properties of the ring of integers
CO2. Explain the factoring in rings of polynomials
CO3. Explain various tests for irreducibility of polynomials with integer coefficients
CO4. Describe the concept of a field extension
CO5. Explain impossibilities in some geometric constructions using ruler and compass on the grounds of field extensions
CO6. Explain the Fundamental Theorem of Algebra
CO7. Explain some basic concepts of Galois Theory
CO8. Exhibit the one to one correspondence between the subgroups of the Galois group of a field extension and the intermediate fields

Course Outcomes of the Course "Real Analysis II"

CO1. Explain the concept of Riemann integrability of a real valued function and generalize it to Riemann-Stieltjes integral
CO2. Describe some properties of integrals
CO3. Generalize the concept of integrals to vector valued functions
CO4. Explain the concept of improper integrals
CO5. Explain the concept of Sequence and Series of functions
CO6. Explain point wise convergence and uniform convergence of sequences and series of functions
CO7. Explain some tests for convergence of sequences and series of functions
CO8. Generalize the concept of differentiation to higher dimensional real spaces

Course Outcomes of the Course "Technology"

CO1. Explain some elementary concepts of Topological spaces
CO2. Describe various topologies on the real line
CO3. Explain the concept of basis and sub basis of a topology
CO4. Describe compact spaces
CO5. Explain Tynchonoff's theorem
CO6. Describe various types of topological spaces on the grounds of separation axioms
CO7. Explain Tietz extension theorem and Urysohn imbedding theorem
CO8. Explain connectedness in topological spaces

Course Outcomes of the Course "Linear Algebra II"

CO1. Generalize the concept of dot product of vectors to define bilinear forms in any real vector space
CO2. Describe Hermitian forms
CO3. Explain spectral theorems on linear operators
CO4. Explain the gist of bilinear forms and Hermitian forms in terms of matrices
CO5. Describe the concept modules over rings
CO6. Diagonalize integer matrices
CO7. Explain the Ascending Chain Condition of ideals and Noetherian rings
CO8. Explain the structure theorem for abelian groups

Course Outcomes of the Course "Ordinary Differential Equations"

CO1. Solve ordinary differential equations using method of variation of parameters
CO2. Explain some basic concepts about Wronskian
CO3. Solve Legendre equation and Bessel equation
CO4. Solve the Systems of first order differential equations
CO5. Explain the existence and uniqueness of solutions
CO6. Know the method of successive approximation to find the solution of initial value problems
CO7. Explain Picard's theorem
CO8. Define the concept of extending a solution of initial value problem to a larger interval

Course Outcomes of the Course "Differential Equations and Applications"

CO1. Explain some applications of first order ordinary differential equations
CO2. Analyze some problems of dynamics and chemical reactions using differential equations
CO3. Solve some problems on growth and decay
CO4. Demonstrate solution of some problems of simple harmonic motions, damped vibrations and forced vibrations
CO5. Solve some problems on electric circuits
CO6. Explain power series method of solving second order linear differential equations
CO7. Solve Bessel equation and Legendre equation
CO8. Solve Hermite's equation

Course Outcomes of the Course "Complex Analysis I"

CO1. Explain Basic properties of complex numbers
CO2. Explain Spherical representation of Complex plane
CO3. Explain analyticity of functions
CO4. Describe elementary theory of Power Series
CO5. Explain Cauchy integral formula
CO6. Find the zeros and poles of functions and their orders
CO7. Explain Taylor's theorem
CO8. Explain the general form of Cauchy theorem

Course Outcomes of the Course "Measure and Integration"

CO1. Explain Algebra of sets
CO2. Generalize the concept of length of an interval to define outer measure of a subset of the real line
CO3. Explain some concepts of measurable functions
CO4. Explain Lebesgue integral of various classes of functions and compare it with the Riemann integral
CO5. Describe the concept of bounded variation in functions
CO6. Explain differentiation of monotonic functions
CO7. Analyze absolute continuity of functions
CO8. Explain the extension theorem of Caratheodary

Course Outcomes of the Course r "Multivariate Calculus and Geometry"

CO1. Extend the concept of differentiability to functions of several variables and explain partial derivatives as well as directional derivatives
CO2. Describe graphs of functions and level sets with their interrelation
CO3. Explain the existence of local maxima and local minima of functions
CO4. Give a mathematical description of space curves
CO5. Extend the integral over an interval to define the line integral over a curve
CO6. Explain geometry of plane curves and extend it to space curves
CO7. Define Double integration and Triple integration with their applications
CO8. Explain geometry of surfaces in space

Course Outcomes of the Course "Communicative Algebra"

CO1. Explain some properties of Prime ideals and Maximal ideals
CO2. Define operations of Ideals
CO3. Explain Isomorphism theorems on modules
CO4. Analyze Nakayama's lemma and exact sequences
CO5. Explain the concept of extended and contracted ideals in rings of fractions
CO6. Define integrally closed integral domains
CO7. Explain some properties of Noetherian rings and modules
CO8. Know primary decomposition in Noetherian rings

Course Outcomes of the Course "Graph Theory"

CO1. Demonstrate some basic concepts of graphs
CO2. Understand some operations of graphs
CO3. Describe various classes of graphs and their properties
CO4. Explain connectivity in graphs
CO5. Describe traversability in graphs
CO6. Describe planarity in graphs
CO7. Describe colorability of graphs
CO8. Explain the relation between some classes of graphs and matrices

Course Outcomes of the Course "Lattice Theory"

CO1. Generalize the order in real line to define a partial order on an arbitrary set
CO2. Describe Axiom of choice and its variants
CO3. Explain order homomorphism
CO4. Describe lattices and some of its types
CO5. Describe compactness of elements in lattices
CO6. Describe distributive lattices and modular lattices
CO7. Explain the concept of complemented lattices
CO8. Explain the concept of Boolean Algebra

Course Outcomes of the Course "Complex Analysis II"

CO1. Explain the calculus of residues
CO2. Explain harmonic nature of a function
CO3. Find Laurent series expansion of some functions
CO4. Explain Gamma function
CO5. Explain product development of Riemann zeta function
CO6. Explain Fourier development
CO7. Define Unimodular transformation
CO8. Explain some general properties of elliptic functions

Course Outcomes of the Course "Function Analysis"

CO1. Explain Baire's theorem
CO2. Explain some basic concepts of Banach spaces
CO3. Explain Hahn Banach theorem
CO4. Explain Open mapping theorem
CO5. Explain some basic concepts of Hilbert spaces
CO6. Explain adjoint of operators
CO7. Explain some basic concepts of normal and unitary operators
CO8. Explain finite dimensional spectral theorem

Course Outcomes of the Course "Partial Differential Equations"

CO1. Solve simultaneous ordinary differential equations
CO2. Solve Pfaffian differential equations
CO3. Explain the origin of first order partial differential equations
CO4. Solve Cauchy problem for a first order linear differential equations
CO5. Solve non linear first ordered partial differential equations using Cauchy's method of characteristics and Charpit's method
CO6. Solve linear partial differential equations with constant coefficients
CO7. Reduce second ordered partial differential equations to canonical forms
CO8. Find solutions to some problems based on partial differential equations of second order

Course Outcomes of the Course "Advanced Topology"

CO1. Describe order relations and dictionary order relations
CO2. Explain Well ordered theorem
CO3. Explain Box topology and Product topology
CO4. Explain countability axioms
CO5. Explain UrysohnMetrization theorem
CO6. Explain the concept of paracompactness
CO7. Explain the concept of homotopy
CO8. Find the fundamental group of a circle

Course Outcomes of the Course "Algebraic Number Theory"

CO1. Describe Algebraic Number Fields
CO2. Describe Ring of Integers
CO3. Explain the irreducible factorization in rings
CO4. Explain Ramanujan-Nagell theorem
CO5. Explain some properties of Dedekind domains
CO6. Explain Ramification index and degree of a prime ideal
CO7. Explain Class group and Class number
CO8. Explain the finiteness of Class number