

Department of Mathematics

Program Outcomes:-

(M.Sc Mathematics)

- Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
- Equip the students with skills to analyze problems, formulation hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- Prepare students for pursuing research on careers in industry in mathematical sciences and allied fields.
- Imbibe effective scientific and/or technical communication in both oral and writing.
- Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
- Create awareness to become an enlightened citizens with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

### Programme Specific Outcomes:-

- Prepare and motivate students for research studies in mathematics and related fields.
- Provide knowledge of a wide range of mathematical techniques and applications of mathematical methods/tools in other scientific and engineering domains.
- Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.
- Good understanding of number theory which can be used in modern online cryptographic technologies.
- Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.
- Assists students in preparing (personal guidance, books) for competitive exams. e.g. NET, GATE, etc...
- Nurture problem solving skills, thinking, creativity through assignment project work.

### Course Outcomes

#### Course Name

Algebra-I

#### Course Outcomes

##### Knowledge Gained

- Concept of group action and theorems about group actions
- Structure of permutation groups
- Polynomial rings, EOs, PIDs & UFDs and relations among them.
- Role Universality of polynomial rings.

##### Skill gained

- Solving problems using powerful concept of group actions.
- Ability to understand a large class of commutative rings by regarding them as quotients of polynomial rings by suitable ideals.

##### Competency developed

Applying concept of group action to real life problem

course name  
Differential Equations  
and Calculus of variations

course outcomes

• Mathematical Statistics

- Differential eqn and its types
- Autonomous system
- Euler's Theorems
- Cauchy Peano Theorems
- Homogeneous and Non-Homogeneous Differential eqn.
- Recognize the role of and applications of probability Theory, descriptive and inferential statistics in many fields.
- Apply parametric appropriate sampling and data collection processes, classification of variables and graphical summary
- Use statistical software for probability simulation and data analysis.
- Define, illustrate and apply the concepts of expectation to mean, variance and covariance of random variables

• Real Analysis

- Basic definition of metric space, normed linear space and inner product space.
- Series and sequence of continuous function
- Inverse and implicit function theorem
- Equicontinuous families
- Ability to handle convergence

• Mechanics-I

- Moments and products of Inertia.
- Angular momentum of rigid body
- Poisson Bracket, Poisson identity
- Hamilton Jacobi Equation

• Abstract Algebra-II

- Polynomial Function
- Finite field, Extension of field
- Galois field
- Reducible and irreducible Polynomial
- Modules



## Course Name

• Complex Analysis

• Measure Theory

• Differential Geometry

• Mechanics of Solid-I

• Discrete Mathematics:

• Analytic Number Theory:

## Course Outcomes

• Analytic functions, C-R differential eqn, harmonic function

• Power series, zero, singularity

• Cauchy residue theorem & applications

• Mobius Transformation

• Definition and properties of the exterior mea-

• Measurable functions

• Lebesgue integration, convergence theorem

• Understanding the concept of curve, tangent, co-ordinate, surface etc.

• Normal tangent, curvilinear co-ordinate

• Geodesics Property

• Torsion of a geodesic

• Stress, Strain, Tensor

• Elasticity, Hooke's law and its generalization.

• Eigen-values and Eigen vector of a second order tensor.

• Gradient, Divergence & curl of a tensor field.

• Concept of graph theory

• Logic, Gate, Proposition

• Trees, Circuits

• Boolean Algebra

• Euler function and theorem

• Congruence relation

• Residue theorem

• Various properties of integers and Prime numbers.

Integral Equation :

- Fredholm Integral Equation
- Volterra Integral Equation
- Euler function and Euler theorem
- Green function and its properties.

Mechanics of Solid - II :

- Studies the behavior of solid materials.
- Understand the action of force, temperature changes, phase changes.
- Design, Analysis and simulation of machines, mobile structure and Pressure vessels.

Seismology :

- Study of earthquakes.
- Propagation of elastic waves through the earth.
- Wave Equation

Mathematical Modelling :

- Concept of mathematical modelling
- Linear growth model
- S-R, S-I-R Models
- Simple compartment Model
- Balance equation
- Partial Differential Equations with modelling.