First Semester M.Sc. (Mathematics) 2023-24

BRIDGE COURSE

ALGEBRA (4 Lectures)

- Group (Definition and examples)
- Properties of a group
- Subgroup (Definition and examples)
- Cosets (Definition and examples)
- Permutation Group (Definition and examples)
- Normal Subgroups
- Homomorphism, Isomorphism, Automorphism and Kernel
- Ring and Subring
- Ideals, Maximal Ideals

TOPOLOGY (4 Lectures)

- Domains of Topology
- Set Theory: Definition, Types, Properties and Operations
- Logic: Properties and operations

Ordinary Differential Equations (4 Lectures)

- Complex Numbers (Introduction)
- Polynomials
- Determinants (Properties and examples)
- Differential Equations (Formulation)
- First order linear Equations
- Linear equations with constant coefficients
- Homogeneous and non-homogeneous equations of order two and order n
- Some methods to solve the non-homogenous equations

Mathematical Statistics (4 Lectures)

- Concept of Sample and Population
- Data and types of data
- Random experiments, sample space, events: independent, mutually exclusive and exhaustive events
- Random variables and it's examples
- Probability and conditional probability (Definition and examples)
- Discrete and continuous random variables
- Probability density function and probability mass function (Definition and examples)

Fuzzy Mathematics (4 Lectures)

- Historical perspective of fuzzy mathematics
- Concept of uncertainty, impression and vagueness
- Classical sets, fuzzy sets and systems
- The basic connectives – inclusion, intersection, union and complementation
- Fuzzy logic and numbers

Integral Equation (4 Lectures)

- Initial value problem
- Boundary Value Problem
- Laplace Equation
- Boundary value problems for Laplace equation
- An important formula for converting a multiple integral into a single ordinary integral
- Introduction to Integral Equations
- Historical background of the integral equation
- Linear and non-linear integral equations
- Relations between differential and integral equations
- Classification of Linear Integral Equations
- Leibnit'z rule of differentiation under integral sign

Research Methodology (4 Lectures)

- Information about Some great Mathematicians
- Introduction to work of some Mathematicians
- Application of derivatives
- Application of integration
- Root finding methods (Numericals)