

## M.Sc. MATHEMATICS COURSE OUTCOME

### SEMESTER – 1

#### MTH1C01 – Algebra – 1

- CO 1: -Students will be able understand Group action and application of  $G$  – set counting
- CO 2: -Students will be able to know Sylow theorems and its application
- CO 3: -Students will be able to understand Rings of polynomials

#### MTH1C02 Linear Algebra

CO 1: - The student will demonstrate knowledge of general vector space

CO 2: - The student will demonstrate knowledge of linear transformation

CO 3: - The student will demonstrate knowledge of inner product space

#### MTH1C03 Real Analysis

- CO 1: - Students will be able understand the basic concepts and theorems of limit, continuity and differentiability
- CO 2: - Students will be able understand concepts of sequence of functions and its applications
- CO 3: - Students will be able understand the concept of metric space and related concepts

#### MTH1C04 Number theory

- CO 1: -Students will able to understand the definitions of congruences, residue classes and least residues
- CO 2: -Students will able to know about number theoretical functions (Möbius, Mangoldt,.....)
- CO 3: -Students will able to know the applications of number theory in Cryptography.

#### MTH1C05 Discrete Mathematics

- CO 1: -Students will able to understand the basic rules, laws and theorem of Boolean algebra.
- CO 2: -Students will able to know the basic concepts of graph, properties of bipartite graph, particularly in trees.
- CO 3: - Students will be able to know about the concept in automata theory.

### SEMESTER – 2

### MTH2C06 Algebra – II

- CO 1: - Students will be able to understand the definitions of different types of ideals
- CO 2: - students will be able to explain the fundamental concept of field extensions, finite extension, algebraic extensions, simple extensions.
- CO 3: - students will be able to Understand the elements of Galois theory

### MTH2C07 Real analysis II

- CO 1: - Students will be able to Understand the fundamental of measure theory and be acquainted with proof of the fundamental theorems underlying the theory of integration.
- CO 2: - Students will be able to Understand how these underpin the use of Mathematics concepts such as area and integration.
- CO 3: - Students will be able to develop a perspective on the broader impact of measure theory

### MTH2C08 Topology

- CO 1: - Students will be able to understand Topological space and Basic concepts in a topological space
- CO 2: - Students will be able to know Quotient space
- CO 3: - Students will be able to understand Separation Axioms

### MTH2C09 ODE & Calculus of Variations

- CO 1: -Students will be able to apply Calculus techniques to first order differential equations to determine properties of solutions such as monotonicity, concavity, symmetry and singularity.
- CO 2: -Students will be able to solve first order differential equations which are exact, separable, homogeneous, linear or Bernoulli using symbolic methods
- CO 3: -Students will be able to construct and analyze models, interpret results and make predictions within the original context.

### MTH2C10 Operations Research

- CO 1: -Students will be able to analyse convex functions and to solve linear programming problem
- CO 2: -Students will be able to solve transportation problem
- CO 3: -Students will be able to solve integer programming problem

## **SEMESTER – 3**

### MTH3C11 Multivariable Calculus & Geometry

- CO 1: -Students will be able to define matrices and determinants

- CO 2: -Students will be able to analyse reparameterization
- CO 3: -Students will be able to define the concept of surfaces, Gauss map and Weingarten map

#### MTH3C12 Complex Analysis

- CO 1: -Students will be able to define the concepts of analyticity and conformality.
- CO 2: -Students will be able to solve problems related to Möbius transformation and complex integration.
- CO 3: -Students will be able to calculate and classify the singularities and residues.

#### MTH3C13 Functional Analysis

- CO 1: - Students will be able to understand Normed spaces and its properties
- CO 2: - Students will be able to understand Hilbert space and various concepts in Hilbert space
- CO 3: - Students will be able to understand the Dual space

#### MTH3C14 PDE and Integral Equations

- CO 1: -Students will be able to solve linear partial differential equations of both first and second order.
- CO 2: -Students will be able to apply the fundamental concepts of Partial Differential Equations and the basic numerical methods for their resolution
- CO 3: -Students will be able to know number of numerical methods for solving integral equations.

#### MTH3E02 Cryptography

- CO 1:- Students will be able to understand the Classical Cryptography
- CO 2:- Students will be able to understand the Shannons Theory
- CO 3:- Students will be able to understand the Block Ciphers

### **SEMESTER – 4**

#### MTH4C15 Advanced Functional Analysis

- CO 1: - Students will be able to understand Operators
- CO 2: - Students will be able to know the construction of the spectral integral
- CO 3: - Students will be able to understand Banach space and important concepts in Banach space

#### MTH4E08 Commutative Algebra (Elective -II)

- CO 1: -Students will be able to analyse the concept of commutative ring with unity
- CO 2: -Students will be able to define Artin ring and Noetherian ring
- CO 3: -Students will be able to understand about primary decomposition

MTH4E09 Differential Geometry (Elective III)

- CO 1: -Students will be able to draw the level sets, graphs, vector fields and surfaces.
- CO 2: -Students will be able to determine and calculate the curvature of used in different coordinate systems.
- CO 3: -Students will be able to know about the parametrization of surfaces.

MTH4E11 Graph Theory (Elective IV)

- CO 1 :- Students will be able to understand the basic concepts of Graph
- CO 2 :- Students will be able to understand the concepts of Colorings and Matchings