

DEPARTMENT OF MATHEMATICS

B.Sc. Mathematics - Learning Outcomes

SEMESTER – 1

CORE - MATHEMATICS

MTS1B01 Basic Logic & Number Theory

- CO 1: - Students will be able to understand the theory and method of solutions of LDE.
- CO 2:- Students will be able to understand the theory of congruence and a few applications.
- CO 3:- Students will be able to solve linear congruent equations.

COMPLEMENTARY – MATHEMATICS

MT1C01 – Mathematics – 1

- CO 1: - Students will be able to understand the concepts limits and continuity
- CO 2: - Students will be able to aware application of derivatives
- CO 3: - Students will be able to know about application of integrals

COMPLEMENTARY – STATISTICS

ST1C01 Basic statistics and probability

- CO 1: - Students will be able to do basic analysis of data and represent it in a graphical way
- CO 2: - Students will be to solve the correlation and regression problems
- CO 3: - Students will be able to understand various approaches to probability and computer probabilities

SEMESTER – 2

CORE – MATHEMATICS

1. MTS2B02 Calculus of Single Variable – 1

- CO 1: -Students will be able to understand the fundamental ideas of limit, continuity and differentiability
- CO 2: -Students will be able to understand some basic theorems of differential calculus

COMPLEMENTARY – MATHEMATICS

MT2C02 – Mathematics – II

- CO 1: - Students will be able to know about vector space

- CO 2: - Students will be able to do convergent and divergent
- CO 3: - Students will be able to understand the concept of hyperbolic function

#### COMPLEMENTARY – STATISTICS

##### ST2C02 – Probability distributions

- CO 1: - Students will be able to understand the applications of theoretical distributions
- CO 2: - Students will be able to understand the concept of mathematical expectation

### **SEMESTER – 3**

#### CORE - MATHEMATICS

##### 2. MTS3B03 Calculus of Single Variable – 2

- CO 1: - Students will be able to understand the idea of improper integrals, their convergence and evaluation.
- CO 2: - Students will be able to understand to the idea of power series
- CO 3: - Students will be able to understand the idea of parameterization of curves

### **SEMESTER – 4**

#### CORE - MATHEMATICS

##### 3. MTS4B04 Linear Algebra

- CO 1: - Students will be able to understand some basic matrix transformations in the  $R^2$  and  $R^3$ , having interest in the field of computer graphics, engineering and physics are studied by specially pinpointing to their geometric effect

#### COMPLEMENTARY – MATHEMATICS

##### MTS4C04 Mathematics IV

- CO 1: - Students will be able to know ordinary differential equations
- CO 2: - Students will be able to understand Laplace Transforms
- CO 3: - Students will be able to understand the Fourier Series

#### COMPLEMENTARY – STATISTICS

##### ST4C04 Applied Statistics

- CO 1: - Students will be able to construct one way and two way ANOVA tables
- CO 2: - Students will be able to find trend values and to draw trend line
- CO 3: - Students will be able to understand the concept of quality control

### **SEMESTER – 5**

## CORE - MATHEMATICS

4. MTS5B05 Theory of Equations and Abstract Algebra
  - CO 1: -Students will be able to understand the formula to solve the third- and fourth-degree polynomial equations by Cardan and Ferrari respectively.
  - CO 2: - Students will be able to understand the theory known as Galois theory to solve the famous problem of insolvability of quintic.
  - CO 3: - Students will be able to understand the abstract notion of a group
5. MTS5B06 Basic Analysis
  - CO 1: - Students will be able to know about sequences, their limits, several basic and important theorems involving sequences and their applications
  - CO 2: -Students will be able to understand some basic topological properties of real number system such as the concept of open and closed sets, their properties, their characterization and so on.
  - CO 3: - Students will be able to get a rigorous introduction to algebraic, geometric and topological structures of complex number system, functions of complex variable, their limit and continuity and so on
6. MTS5B07 Numerical Analysis
  - CO 1: - Students will be able to understand the concept of interpolation and also learn some well known interpolation techniques.
  - CO 2: -Students will be able to understand a few techniques for numerical differentiation and integration and also realize their merits and demerits.
  - CO 3: -Students will be able to find out numerical approximations to solutions of initial value problems and also to understand the efficiency of various methods.
7. MTS5B08 Linear Programming
  - CO 1: -Students will be able to solve linear programming problems geometrically
  - CO 2: - Students will be able to understand the drawbacks of geometric methods
  - CO 3: - Students will be able to understand duality theory, a theory that establishes relationships between linear programming problems of maximization and minimization
8. MTS5 B09 Introduction to Geometry
  - CO 1: -Students will be able to recognise and classify conics.
  - CO 2: - Students will be able to understand Kleinian view of Euclidean geometry
  - CO 3: -Students will be able to understand affine transformations, the inherent group structure, the idea of parallel projections and the basic properties of parallel projections
9. MTS5D03 Linear Mathematical Models
  - CO 1: - Students will be able to solve systems of Linear equations

- CO 2: - Students will be able to understand the concept matrices and its properties
- CO 3: - Students will be able to understand the simplex method.

### SEMESTER - 6

#### 10. MTS6B10 Real Analysis

- CO 1: -Realise the difference between continuity and uniform continuity and equivalence of these ideas for functions on closed and bounded interval
- CO 2: -Understand the difference between pointwise and uniform convergence of sequences and series of functions
- CO 3: -Learn and find out examples/counter examples to prove or disprove the validity of several mathematical statements that arise naturally in the process/context of learning

#### 11. MTS6B11 Complex Analysis

- CO 1: -To understand the difference between differentiability and analyticity of a complex function and construct examples
- CO 2: -To understand necessary and sufficient condition for checking analyticity
- CO 3: -To know a few fundamental results on contour integration theory such a Cauchy's theorem, Cauchy – Goursat theorem and their applications
- CO 4: -To understand and apply Cauchy's integral formula and a few consequences of it such as Liouville's theorem, Morera's theorem and so forth in various situations

#### 12. MTS6B12 Calculus of Multivariable

- CO 1: -Understand several contexts of appearance of multivariable functions and their representation using graph and contour diagrams
- CO 2: -Understand the notion of partial derivative, their computation and interpretation
- CO 3: -Understand the idea of line integral and surface integral and their evaluations
- CO 4:-Learn three major results viz. Green's theorem, Gauss's theorem and Stokes' theorem of multivariable calculus and their use in several areas and directions

#### 13. MTS6B13 Differential Equations

- CO 1: -They will learn an ODE is, what it means by its solution, how to classify DEs, what it means by an IVP and so on
- CO 2: -They will realise the basic differences between linear and nonlinear DEs and also basic results that guarantees a solution in each case

- CO 3: -They will learn a method to approximate the solution successively of a first order IVP
- CO 4: -Students learn the technique of solving partial differential equations using the method of separation of variables

14. MTS6B14(E01) Graph Theory (Elective)

- CO 1: - Students will be able to understand the Basic concepts in the graph theory
- CO 2: - Students will be able to understand the concept of Spanning trees
- CO 3: - Students will be able to understand the concept of planner graph