

**Department of Mathematics**  
**Discipline Specific Minor Course**  
**(Semester-II)**

Year	Semester	Course Type	Course Code	Course Title	Theory/ Practical	Credits	No. of Lectures/ Practical to be conducted	Page No.
1 <sup>st</sup>	II	DSC (Minor)	MT-MN-126T	Fundamentals of Mathematics	Theory	2	30L	1-2

**DISCIPLINE SPECIFIC MINOR COURSE (MT-MN-126T): Fundamentals  
of Mathematics**

Course Code & Title	Credits	Credit Distribution of the Course	
		Theory	Practical
<b>MT-MN-126(A)T: Fundamentals of Mathematics</b>	<b>2</b>	<b>2</b>	--

**LEARNING OBJECTIVES:**

The Learning Objectives of this course are as follows:

- Determine whether a relation is a function and identify the types of relations, domain and range of a function.
- Solve various problems on properties of complex numbers.
- Solve the problems of system of linear equations by various methods

**COURSE OUTCOMES:**

After completion of this course student will be able to:

- CO-1:** Solve problems on equivalence relations, functions, inverse functions, composition of functions.
- CO-2:** Write the system of  $m$  linear equations in  $n$  unknowns in matrix form equations and solve them by using the concept of rank of a matrix.
- CO-3:** Solve the problems on system of linear equations by various methods.
- CO-4:** Solve problems on basic properties of complex numbers, different forms of complex numbers, and regions in the complex plane.

**SYLLABUS OF MT-MN-126(A)T: Fundamentals of Mathematics**

**Unit I: Sets Relations and Functions**

**[10 Hours]**

1.1 Sets, Relations, Equivalence relations.

1.2 Functions, Basic terminology, Types of functions, Inverse of a function, Composition of functions (Excluding theorems only examples).

**Unit II: Matrices and System of linear equations.**

**[12 Hours]**

3.1 Row echelon form of a matrix, reduced row echelon form of a matrix.

3.2 Definition of rank of a matrix using row echelon or row reduced echelon form.

3.3 System of linear equations- Introduction, matrix form of linear system, definition of row equivalent matrices.

3.4 Consistency of homogeneous and non-homogeneous system of linear equations using rank, condition for consistency.

3.5 Solution of System of Equations: Gauss elimination and Gauss-Jordan elimination method, examples.

### Unit III: Complex Numbers

[08 Hours]

4.1 Sums and Products, Basic Algebraic Properties, Moduli, Complex Conjugates, Exponential form, Products and Quotients, De-Moivre's theorem (without proof).

4.2 Roots of Complex Numbers: The nth roots of unity.

### ESSENTIAL/RECOMMENDED READINGS:S

1. A Foundation Course in Mathematics, Ajit Kumar, S. Kumeresan and Bhaba Kumar Sarma, Narosa Publication House  
Unit 1: Chapter- 2,2.1,2.4,2.5, Chapter- 3(3.1 to 3.4), Chapter- 4(4.1 to 4.3)
2. H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed Wiley, (1994). Unit -2: Chapter 1-1.2
3. Complex Variables and Applications, James Ward Brown and Ruel V. Churchill, Mc-Graw Hill, Seventh Edition, Unit -3: Chapter 1

