Course Name: Elementary Mathematics

Course Code: DSC-M-IMSCIT-113T

Course Credit: 2

Course Outcomes:

This is a fundamental course in mathematics. It will be very useful for the subjects like Discrete Mathematics, GIS, Image processing.

By completing this course a student will:

➢ Know about basic set theoretic operations.
➢ Learn about relations and its types.
➢ Learn about different types of functions and its domain and range.
➢ Be able to work with matrices, find inverse and perform some operations on matrix.
➢ Be able to solve system of linear equations using matrix theory.
➢ Learn to find rank of any matrix.

Contents:

Unit No.	Course Content	Hours	Credits
1	**Relation and function** • Basic notion of set, operations on sets, power set, De morgan's law, relation, types of relations, partial order relation, equivalence relation. • Functions, types of functions, invertible function, operation on functions, domain and range of algebraic functions, trigonometric functions, exponential and logarithmic functions, rational functions, zeroes of functions, continuity of functions and the concept of tangent line and asymptote in reference to above functions.	15	1
2	**Theory of Matrices** • Matrix and its types, operations on matrices, adjoint of a matrix, elementary row operations, row reduced echelon form of a matrix, rank of matrix, matrix inversion by adjoint method, matrix inversion by row operations, determinant, properties of determinant, solution of simultaneous system of linear equations by adjoint method, Gauss Jordon method, Gauss elimination method.	15	1

Reference Books:

1. 11th Science Gujarat Board textbook and 12th Science Gujarat Board textbook
2. Set theory: A First Course,
   By Daniel W. Cunningham, Cambridge University press.
3. Guide to discrete mathematics,
   By Gerald O'Regan, Springer.
4. Engineering mathematics,
   By B.S. Grewal, Khanna publishers, New Delhi.
5. Advanced engineering mathematics,
   By H.K. Dass, S. Chand.

Accomplishments of the student after completing the Course:

Upon successful completion of the "Elementary Mathematics" course, students will be able to:

- Have a solid grasp of basic set theoretic operations.
- Demonstrate an understanding of the power set, operations on sets, and De Morgan's law.
- Identify and classify various types of relations, including partial order and equivalence relations.
- Distinguish among different types of functions such as algebraic, trigonometric, exponential, logarithmic, and rational functions.
- Identify the domain and range of various functions.
- Understand the operational aspects of functions, including the invertible function.
- Appreciate concepts like zeroes of functions, continuity of functions, and associated tangents and asymptotes.
- Identify and differentiate between various types of matrices.
- Execute operations on matrices efficiently.
- Transform matrices using elementary row operations and achieve the row reduced echelon form.
- Ascertain the rank of matrices.
- Calculate determinants and appreciate their properties.