Core Course
CC-104 Basics of Mathematics

Course Introduction:
This course aims to provide student with the knowledge and skills necessary to interpret and use basic mathematical data, symbols and terminology useful in computer science. The knowledge of the subject forms the base of computer science.

Objectives:
The objective of this course is to enable students to understand concepts of Set Theory, Coordinate Geometry, Matrix Algebra and Calculus and solve simple application problems related to Computer Science based on these.

No. of Credits: 3
Theory Sessions per week: 4
Teaching Hours: 40 hours

UNIT	TOPICS / SUBTOPICS	TEACHING HOURS
1	**Set Theory and Functions**	**10 hours**
	• Basic definitions of Set Theory • Methods of representation of Set (Property method, Listing method)	1 hrs
	• Set operations (Union, Intersection, Complement of a set, Difference of sets, Symmetric difference, Cartesian product of sets)	2 hrs
	• Properties of set operations (Commutative, Associative, Distributive, De-Morgan's laws) • Power set and Cardinality of sets.	2 hrs
	Functions	
	• Introduction of Functions • Definition of function • Domain, Co – domain • Range of a function	1 hrs
	• Graph of a functions	1 hrs
	• Types of Functions (Linear, Quadratic, Polynomial, Implicit and • Explicit functions and examples related with it)	2 hrs
	• Exponential and Logarithmic with their properties and related examples, Introduction to Trigonometric functions.	1 hrs
2	**Matrix**	**10 hours**
	• Definition of Matrix • Types of Matrix (Square, Row, Column, Zero, Diagonal, Scalar, Identity, Transpose, Symmetric, Skew – symmetric)	2 hrs
	• Arithmetic operations of Matrices (Addition, Scalar Multiplication, Matrix Multiplication)	3 hrs
	• Introduction to Determinants • Invertible matrix	1 hrs
	• Computation of Inverse using Definition	1 hrs

	• Simultaneous Solution of set of Linear equations using Cramer's • Rule • Matrix inversion method • Rank of Matrix	3 hrs
3	**Co–ordinate Geometry**	**10 hours**
	• Introduction to Co-ordinates • Quadrants and Lines • Distance formula in R2 (without proof)	2 hrs
	• Section Formula (without proof)	1 hrs
	• Area of a triangle (without proof) and related examples	2 hrs
	• General Equation of a Straight line • Slope and intercepts of a line	2 hrs
	• Parallel Lines • Perpendicular Lines • Angle between two lines (without proof) and related examples	3 hrs
	Simple examples should be asked for the above concepts.	
4	**Limit, Differentiation and Integration**	**10 hours**
	• Limit o Expansion of concept of Limit o Some Standard Limits (without proof) o Continuity of a function o Discontinuity and Examples	2 hrs
	• Differentiation o Definition of Derivative o Rules for Differentiation (without proof) o Differentiation of function of a function o Chain Rule o 2^{nd} order derivatives	5 hrs
	• Integration o Introduction to indefinite integral o Definition of Integration & Methods of Integration o Substitution Methods o Some Standard Formulae (without proof) and example based on the standard forms o Introduction to definite integration and simple examples on it	3 hrs

Textbook:

Business Mathematics (Latest Edition)
Publisher: S. Chand and Sons Publications
By: V.K.Kapoor

Reference Book:

Engineering Mathematics (Third Edition)
Publisher: Pearson Education
By: Anthony Croft, Robert Davison, Martin Hargreaves