

Course Title: **Mathematics II (3 Cr.)**

Course Code: **CACS154**

Year/Semester: **I/II**

Class Load: **5 Hrs. / Week (Theory: 3 Hrs, Tutorial: 1 Hr., Practical: 1 Hrs)**

Course Description

This course includes the topics from calculus and computational methods such as limits and continuity, differentiation & its applications, integration and its applications, differential equation and different computational techniques which are essential as mathematical foundation for computing.

Course Objectives

This course makes students able to cognize the concept Calculus, Computational methods and their applications in the area of Social Science and Computer Application.

Course Contents

Unit 1 Limits and Continuity

6 Hrs.

Limit of a function, Indeterminate forms, Algebraic properties of limit (without proof), Theorems on Limits of Algebraic and Transcendental Function. Continuity of a function, types of discontinuity. Exercises on evaluation of limits and test of continuity. (Mathematica)

Unit 2 Differentiation

6 Hrs.

Ordered Pairs, Cartesian Product, Relation, Domain and Range of a Relation, Inverse of a Relation; Types of Relations: Reflective, Symmetric, Transitive, and Equivalence Relations. Definition of Function, Domain and Range of a Function, Inverse function, Special Functions (Identity, Constant), Algebraic (Linear, Quadratic, Cubic), Trigonometric and Their Graphs. Definition of Exponential and Logarithmic functions, Composite Function. (Mathematica)

Unit 3 Application of Differentiation

8 Hrs.

The derivatives and slope of the curve; Increasing and decreasing function; convexity of curves; maximization and minimization of a function; Differentiation and marginal analysis; price and output; Competitive equilibrium of firm, Illustrations. Drawing graphs of algebraic function by using first and second order derivatives. (Mathematica)

Unit 4 Integration and Its Applications

8 Hrs.

Riemann Integral; Fundamental Theorem (Without Proof); Technique of Integration; Evaluation and Approximation of Definite Integrals; Improper Integrals; Applications of Definite Integrals: Quadrature, Rectification; Volume and Surface Integral. Trapezoidal and Simpson's Rules of Numerical Integration. (Mathematica)