

## DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

### Programme: B. Tech (Minor in Economics)

### Course Title: Mathematics for Economic Analysis

**Course Category: Minor**

**Internal: 50 Marks**

**Course Code: HSME 303**

**Theory: 50 Marks**

**Credits: 3 (L-3)**

**Total: 100 Marks**

**Semester: 6<sup>th</sup>**

**Time: 3hrs**

#### Course Objectives

This course is designed to equip students with various applications of mathematical tools and techniques in defining and developing economic relationships.

#### Instructions for Examiner

The number of questions to be set will be five, at least one from each unit. The examinees will be required to attempt all five questions. All questions shall carry equal marks.

#### Unit I

Derivatives: More on Differentiation; Elasticity; First order and second order derivatives. Their characterizations and applications. Partial and Total Derivatives and single-variable optimization using differentiation. Economic Applications of Derivatives: Concave and convex functions. Maxima and Minima. Cost minimization and profit maximization.

#### Unit II

Linear algebra: Systems of linear equations: properties of their solution sets; determinants: characterization, properties and applications, rank of matrix and linear dependence.

#### Unit III

Further geometric properties of functions: unconstrained optimization: geometric characterizations, characterizations using calculus and applications; Constrained optimization with equality constraints: Geometric characterizations, lagrange characterization using calculus and applications; properties of value function: envelope theorem and applications.

#### Unit IV

Integration: Area under curves; Indefinite Integrals; Definite Integrals; Methods of Integration; Integration by Parts and integration by substitution. Differential equations: Introduction to Differential Equations; integral curve; Solving Differential Equations; separable equations; Integrating Factor; direction diagram and slope field; qualitative theory and stability.

#### Course Outcomes

Students would be able to apply the methods of mathematics in solving the real life complex economic problems.

#### Suggested Readings

1. Sydsæter K, Hammond PJ. Essential mathematics for economic analysis. Pearson Education; 2008.
2. Henderson, J. M. and R.E. Quandt (1980), Microeconomic Theory: A Mathematical Approach, McGraw Hill, New Delhi.
3. Allen, R.G.D. (1976), Mathematical Economics, Macmillan, London.
4. Simon CP, Blume L. Mathematics for economists. New York: Norton; 1994 Apr.
5. Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics, McGraw Hill, New York.