

**BA (HONS) ECONOMICS
1st SEMESTER
DISCIPLINE SPECIFIC COURSE-II (CORE-2)**

ECH120C2: MATHEMATICAL METHODS FOR ECONOMICS —I

**CREDITS: THEORY: 4, TUTORIAL: 2
MAX. MARKS: THEORY: 60, TUTORIAL: 30**

THEORY (4 CREDITS; 60 HOURS)

Course Description: This is a core course of 06 credits (04 units of 01 credit each and tutorials of 2 credits).

Course Objectives: The objective of this course is to introduce the students with the basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus.

Course Outcomes: After the completion of this paper, the student is expected to have a thorough understanding of the relevant Mathematical methods and their application in Economics.

Unit I: Basic Concepts (15 Hours)

Number System; Elementary Set Theory- Sets and Set Operations; Cartesian Product of Sets; Sets of points: ordering of sets; sequence of points and convergence of sequences; bounds, bounded & unbounded sets; closed and open sets, compact sets; connected, concave and convex sets.

Unit II: Relations and Functions (15 Hours)

Relations; Functions- Functions of one & several variables; Scalar & Vector valued Functions; linear, convex & concave Functions; Objective Functions; Composite Functions; Inverse Functions; Logarithm and Exponential Functions.

Unit III: Differentiation I (15 Hours)

Limit of a Function; Limit Theorems; Continuity & Differentiability of a Function; Concept of Derivative; Rules of Differentiation for a Function of one variable; Rules of Differentiation involving two or more Functions of same variable & Different variables; Higher order derivatives of a function of one variable; Partial (first & higher orders) and Total Differentiation; Functions of several variables.

Unit IV: Differentiation II (15 Hours)

Differentials and Derivatives; Point Elasticity & Differentials; Rules of Differentials; Total Differentials; Total Derivatives; Implicit Function Theorem; Applications in Economics; Optimum Values & Extreme Values; Relative Maxima & Minima; Relative & Absolute Extremum; First and Second derivative tests - Necessary & Sufficient conditions.

Tutorials (2 Credits)

- Examples of Sets from Economics
- Discussing Several Economic Functions
- Application of Differentiation in Economics
- Inflection Point and Optimum Point.

Basic Readings

1. Chiang, A.C., *Fundamental Methods of Mathematical Economics*, McGraw Hill, 1988.
2. Allen, R.G.D., *Mathematical Analysis for Economists*, Macmillan Press 1976.
3. Yamane, Taro, *Mathematics for Economists: An Elementary Survey*, Prentice Hall, 1985.
4. Dowling, E. T. (2001). *Schaum's outline of theory and problems of introduction to mathematical economics*.
5. Simon C. P. & L. Blume, *Mathematics for Economists*, Norton & Company, 1994.
6. Klein, Erwin, *Mathematical Methods in Theoretical Economics*, Academic Press.

***Additional Readings are available with the concerned teacher.**