

**BA (HONS) ECONOMICS
2nd SEMESTER**

DISCIPLINE SPECIFIC COURSE-I (CORE-4)

ECH220C2: MATHEMATICAL METHODS FOR ECONOMICS - II

**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 aim of this course is to prepare the students to understand the Integration, Matrix algebra and Optimization techniques that are used in decision making.

Course Outcomes: After the completion of this paper, the student is expected to have a thorough understanding of the various concepts related to Integration, Matrices & Optimization coupled with their application in Economics.

Unit I: Integration (15 Hours)

Integration- Concept and Fundamental Theorem's; Rules & Techniques of Integration of Function of one variable; Indefinite and Definite Integrals; Improper Integrals; Economic Application of Integrals- Consumer's & Producer's Surplus; Investment and Capital Formation.

Unit II: Matrix Algebra (15 Hours)

Matrices & Vectors- Types and Operations; Determinants; Transpose and Inverse of a Matrix; Determinants & operations with Determinants; Rank of a Matrix; Cramer's Rule; Matrix Inversion Method; Positive/Negative, Definite/Semi-definite Matrices; Jacobian and Hessian Rule; Solving the system of Simultaneous Equation.

Chapter III: Optimization with Equality Constraints (15 Hours)

Constrained & Unconstrained Optimization of Scalar & Several variable Functions; Stationary conditions and values; Necessary Vs. Sufficient conditions; Effects of a constraint; Substitution Method; Lagrange Multiplier Method; Indirect Utility Function; Economic Applications- Utility Maximization; Homogenous Functions and Least Cost Combination of Inputs.

Chapter IV: Advanced Optimization (15 Hours)

Formulation of Linear Programming Problem; Simplex method of solving Linear Programming Problems. Non-Linear Programming & Kuhn- Tucker Conditions.

Tutorials (2 Credits)

- Working on Consumer's & Producer's Surplus
- Application of Leontief Method
- Hicksian & compensated Demand Curve
- Examples on Simplex method

Basic Readings

1. Chiang, A.C., *Fundamental Methods of Mathematical Economics*, Tata McGraw Hill, 1988.
2. Chiang, A.C., *Elements of Dynamic Optimization*, Tata McGraw Hill, 1992.
3. Intriligator, M. D., *Mathematical Optimization and Economic Theory*, Prentice Hall, 1971.
4. Franklin, J., *Methods of Mathematical Economics: Linear and Nonlinear Programming, Fixed Point Theorems*, Springer-Verlag Inc., New York, 1980.
5. Lambert, Peter J., *Advanced Mathematics for Economists: Static & Dynamic Optimization*, Blackwell Publishers, New York, 1985.
6. Franklin, J., *Methods of Mathematical Economics: Linear and Nonlinear Programming, Fixed Point Theorems*, Springer-Verlag Inc., New York, 1980.
7. NCERT Mathematics Text Books (11th and 12th).

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