M.A I Semester

(Paper –III)

Course Title	**Mathematics for Economics**
Course Type	**Core Course**
Credit Value	**0**5
Max. Marks	**100**
Course Learning Outcomes CLO)	**On successful completion of this course, the students will be able to:** **1.** Explain the interrelationships between mathematics, mathematical economics, and econometrics. **2.** Demonstrate a clear understanding of various number systems and effectively apply them in economic contexts. **3.** Utilize set theory concepts, including operations on sets, to represent and analyze economic problems. **4.** Perform matrix operations, including addition, multiplication, finding inverses, and determinants, to solve economic models. **5.** Employ various methods to solve systems of linear equations arising in economic applications. **6.** Employ various methods to utilize Integration and Differentiation

Unit	**Topics**
Unit-1 **Introduction to Mathematical Economics**	The nature of Mathematical Economics; Mathematical vs. Non-mathematical Economics; Variables (Endogenous and Exogenous), Constant, Coefficient and Parameters; Equations, In-equations and Identities. Mathematical Preliminaries: Number system, Natural numbers, Whole numbers, Integers, Rational and Irrational numbers, Complex numbers, Indices and surds, Laws of indices, Logarithms. IKS: Karani (Surds) --- **Activity**- Identify Endogenous, Exogenous variables from current affairs citing at least 5 newspaper articles
Unit -2 **Sets and Functions**	Definition of Set, Elements, Set Notations (enumeration and description); Finite and infinite sets; Relationship between Sets - Equal Sets, Subset, Superset, Power Set, Null or Empty sets, Disjoint Set; Operations on Sets - Union, Intersection, Complement Set, Universal Sets; Laws on Set Operations - Commutative and Distributive Law. Relations and Functions: Definition, Domain and range of function, Continuous and discrete function, Composition and inverse function,

	Order of composition, Decomposition of a function, Classification of functions. --- **Activity** - Identify 5 Functions from Economics.
Unit -3 **Matrices, Determinants and Simultaneous Linear Equations**	Concept of Matrices, Type of Matrices, Operations on Matrices, Addition and Multiplication of Matrices, Singular and Non - Singular Matrices, Transpose, Ad-joint and Inverse of Matrices; Determinants, Solution of Simultaneous Linear Equations. --- **Activity** -Give 5 examples of dataset arranged in a Matrix form.
Unit -4 **Differentiation**	Derivative, Process of Differentiation, Rules of Differentiation of a function, Derivatives of higher order, Sign of derivative and nature of function, I and II order conditions for Maxima and Minima and saddle point. --- **Activity**- Utilize Differentiation to calculate Marginal Utility for a Utility Equation.
Unit -5 **Integration**	Basic formula of integration, Standard results, substitution method, Method of partial fractions; Application of Integration in Economics. --- **Activity**- Utilize Integration to calculate Consumer Surplus for a Demand Equation.

Recommended Supporting Books/Texts/Reading Material:

1. A. C. Chiang, "Fundamental Methods of Mathematical Economics," Me Graw-Hill, New York, 1984.
2. Business Mathematics - P. Mariappan, Publisher: Pearson
3. Mathematics for Economists - B.C. Mehta, G.M.K. Madanani, Publisher: Sultanchand & Sons
4. Business Mathematics- M. Wilson, Publisher : Himalaya Publishing House
5. An Introduction to Mathematical Economics - D. Bose, Publisher: Himalaya Publishing House
6. Sydsaeter, K., Hammond, P. (2002). Mathematics for economic Analysis, Pearson Educational.
7. History and Development of Mathematics in India, 2022, pp. 182-192.