Semester	I
Course	Major
Paper Code	C1EC230121T
Paper Title	MATHEMATICAL METHODS IN ECONOMICS–I
No. of Credits	4
Theory/Practical / Composite	Theory
No. of periods assigned	4
Minimum No. of preparatory hours per week a student has to devote	Four (4)
Course Outcomes / Learning Outcomes	1) To understand two vital tools for all of mathematics namely set operations and functions. 2) To study sequences and series to gain intuition about the rather perplexing notions of infinity and infinitesimally small numbers. Economic applications of series and sequences, in particular the notion of discounting future stream of payments or receipts, which is a critical aspect of judging the value of an investment by a business or government. 3) In modelling economic problems we often assume that we can represent various economic concepts by continuous functions. So it is important to know precisely what is the content of this assumption, especially in many instances there is a natural reason to believe that the function will not be continuous everywhere, and in such cases this turns out to be an important consideration from an economic standpoint. 4) To introduce basic concepts of integration of functions and difference equations
Syllabus	**Module 1 (55 marks)** **1.Preliminaries** Logic and proof techniques; sets and set operations; relations; functions and their properties; number systems. **2.Functions of one variable** Graphs; elementary types of functions: quadratic, polynomial, power, exponential, logarithmic; sequences, series and limits, algebraic properties and applications; continuous functions: characterizations, properties with respect to various operations and applications; differentiable functions: characterizations, properties with respect to various operations and applications; second and higher order derivatives: properties and applications. **3.Single-variable optimization** Geometric properties of functions: linear concave and convex functions, their characterizations and applications; local and global optima: geometric characterizations, characterizations using calculus and applications. **Number of Classes per week: 3** **Module 2 (15 marks)** **4.**Integration of Functions: Methods of integration, Definite Integral as area under curve; Difference Equations: First order and second order with economic applications **Number of Classes per week: 1**

Readings	1. K.Sydsaeter and Hammond,*MathematicsforEconomicAnalysis*, Pearson Educational Asia: Delhi,2002.
	2. E. Silberberg and Suen, Structure of Economics, McGraw-Hill
	3. A. Mukherjee and S.Guha, *Mathematical Methods & Economic Theory*, OxfordUniversity Press, 2011.
	4. K.G. Binmore, *Mathematical Analysis*, Cambridge University Press, 1991.
	5. Alpha Chiang and Kevin Wainwright, *Fundamental Methods of MathematicalEconomics,* Fourth Edition, Mc-graw Hill, 2005.
Evaluation	Continuous Internal Assessment: 30 marks End- Semester Theory Examination: 70 marks

Paper Structure for End Sem

Module	No. of Questions to beAnswered	No. of Alternatives	Marks
Module 1	3	4	5 x 3 = 15
	4	5	10 x 4 = 40
Module 2	1	2	5 x 1 = 5
	1	2	10 x 1 = 10
Total Marks			70

70