

Semester	I
Paper Number	<b>MECO4103</b>
Paper Title	<b>Quantitative Economic Analysis I</b>
No. of Credits	6
Theory/Composite	Theory
No. of periods assigned	6 Theory
Course description/objective	<p>Traditional advanced calculus is a course with topics in calculus emphasizing problem solving method. This course emphasizes on theory.</p> <p>To provide an accessible, reasonably paced course in fundamental concepts and techniques of real analysis.</p> <p>The course intends to go beyond the routine manipulations of formulas to solve standard problems and to develop the ability to think deductively and analyse mathematical situations.</p> <p>The objective is to give a thorough treatment of sequences in <math>\mathbb{R}</math> and the associated limit concept.</p> <p>5. To understand the importance of linear mathematical models in economics.</p> <p>6. The use of differential equations to study simultaneous system.</p>
Syllabus	<p><b>Module 1: Real Analysis (50 Marks)</b></p> <p>Unit 1 : Sets and functions- Subsets, Algebraic Operations on Sets- Cartesian Product of sets- Relation on a set- order relation on a set- Function- equipotent sets – enumerable sets.</p> <p>Unit 2 :The Real Numbers- Natural numbers, Integers- rational numbers, Real Numbers(extended set)</p> <p>Unit 3 : Sets in <math>\mathbb{R}</math> – Interval, Neighborhood, Interior Point, Open Set, Limit Point, Isolated Point, Bolzano-Weierstrass Theorem, Derived Set, Closed Set.</p> <p>Unit 4 : Sequence – Real Sequence, Bounded sequence, Limit of a sequence, convergent sequence, Limit theorems, divergent sequence, some important limits, monotone sequence, sub sequence, subsequential limit, characterization of a compact set, Cauchy Criteria.</p> <p>Unit 5: Series: Infinite series, series of positive terms, tests for convergence, conditionally convergent series.</p> <p>Unit 6 : Limits- Limits of a function, one-sided limits, infinite limits, limits at infinity ,infinite limits at infinity, limits of monotone function.</p> <p>Unit 7 : Continuity – Continuity of some important functions, discontinuity, properties of Continuous functions- intermediate value theorem , uniform continuity-continuity on a compact set.</p> <p><b>Module 2: Linear Algebra and Programming (30 marks)</b></p> <p>Unit 1: Introduction to Matrices and Vectors: Matrix, Determinant, Inverse Matrix, Special Matrix</p> <p>Unit 2: Eigenvalues and Eigenvector- Vector spaces, Rank of a matrix, The Eigen problem, The Diagonalisation of a Square Matrix, Quadratic Forms.</p> <p>Unit 3: Concave Programming and the Kuhn-Tucker conditions- Optimisation over an Interval, Direct Restrictions on Variables, The Concave Programming Problem, Many variables and Constraints.</p> <p>Unit 4: Simultaneous Systems of Differential Equations-Linear Differential Equation System, Stability Analysis and Phase Diagrams.</p>

Readings	<p><b>Module 1</b></p> <ul style="list-style-type: none"> <li>• Bartle R.G &amp; Sherbert D.R: Introduction to Real Analysis, John Wiley &amp; Sons,1982.</li> <li>• Goldberg R.R: Methods of Real Analysis, Oxford-IBH,1970</li> <li>• Apostol T.M.: Mathematical Analysis, Addison Wesley, 1974.</li> <li>• Proter M.H. &amp; Morrey C.B.: A First Course in Real Analysis, Springer-Verlag,1991.</li> <li>• Royden H.L.: Real Analysis, Macmillan, N.Y., 1988</li> <li>• Rudin W.: Principles of Mathematical Analysis, McGraw-Hill, 1964.</li> <li>• Parzinsky W.R. &amp; Zupse P.W.: Introduction to Mathematical Analysis,McGraw-Hill, 1982.</li> <li>• White A.J.: Real Analysis, Addison Wesley, 1977.</li> </ul> <p><b>Module 2</b></p> <ul style="list-style-type: none"> <li>• G. Hadley-Linear Algebra. Narosa Publishing House 1987.</li> <li>• K.Sydsaeter and P.Hammond, <i>Mathematics for Economic Analysis</i>, Pearson Educational Asia: Delhi,2002.</li> <li>• M.D. Intrilligator-Mathematical Optimisation and Economic Theory, Prentice- Hall 1971.</li> <li>• Lawrence Blume and Carl Simon, <i>Mathematics for Economists</i>,W.W. Norton and Company, 1994.</li> <li>• Chiang &amp;Wainwright(2017) Fundamental Methods of Mathematical Economics Paperback, McGraw Hill</li> </ul>			
Evaluation	Continuous Internal Assessment: 20 marks End- Semester Theory Examination: 80 marks			
Paper Structure for End Sem Theory	Module	No. of Questions to be Answered	No. of Alternatives	Marks
	Module 1	4	5	5 x 4 = 20
		3	4	10 x 3 = 30
	Module 2	2	3	5 x 2 = 10
		2	3	10 x 2 = 20
	Total Marks			80