

Course Code	Course Title	L	T	P	C
BHUM212L	Mathematics for Economic Analysis	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			
<b>Course Objectives</b>					
<ol style="list-style-type: none"> <li>1. To provide basic mathematical tools and techniques to solve the problems that arise from Economics</li> <li>2. To develop skills in Mathematical Modelling</li> <li>3. To demonstrate the use of Mathematics in understanding theoretical Economics</li> </ol>					
<b>Course Outcomes</b>					
Upon successful completion of the course students will be able to					
<ol style="list-style-type: none"> <li>1. Demonstrate the use of tools of differentiation in solving the economic problems.</li> <li>2. Apply mathematical techniques to economic theory.</li> <li>3. Describe economic problems in mathematical terms.</li> <li>4. Implement methods from calculus to find the optimal location and value (maximum/minimum) of a mathematical function.</li> <li>5. Explain the constrained optimization techniques in economic models and apply them to economic problems.</li> <li>6. Apply the optimization techniques to economic problems.</li> </ol>					
<b>Module:1</b>	<b>Economic Models and Functions</b>	<b>6 hours</b>			
Equations and Identities, The Real Number System, The Concept of Sets, Functions – Types. Graphs of Functions, Types of Functions; Linear, Quadratic, Polynomial, Power, Exponential and Logarithmic functions – Limits and continuity. Economic Applications - Demand, Cost and Revenue functions.					
<b>Module:2</b>	<b>Unconstrained Optimization</b>	<b>5 hours</b>			
Slopes of Curves, Simple Rules of Differentiation, Second and Higher order derivatives, Maxima and Minima, Convex and Concave functions. Economic Applications – Marginal Revenue, Marginal Propensity to Consume.					
<b>Module:3</b>	<b>Derivatives and Optimization</b>	<b>5 hours</b>			
The Chain Rule, Partial Elasticities, Homogeneous and Homothetic functions and Systems of Equations. Economic Applications – Macroeconomic Models.					
<b>Module:4</b>	<b>Multi Variable Optimization</b>	<b>7 hours</b>			
Functions of Several Variables, Geometric representation of functions of several variables, Partial derivatives, Higher order partial derivatives. Economic Applications - Marginal Product of Labour and Capital.					
<b>Module:5</b>	<b>Constrained Optimization</b>	<b>6 hours</b>			
The Lagrange Multiplier method, Economic Interpretations of Lagrange Multipliers, Linear Programming Problems - Kuhn-Tucker Method, Kuhn-Tucker Sufficiency Theorem, Arrow - Enthoven Sufficiency Theorem. Economic Applications – Utility Maximization with Constraints.					
<b>Module:6</b>	<b>Integration, Differential and Difference Equations</b>	<b>6 hours</b>			
Definite and Indefinite Integrals and Economic Applications, First order and Second order Difference equations, First order and second order differential equations. Economic Applications- Income Distribution.					
<b>Module:7</b>	<b>Matrix and Vector Algebra</b>	<b>8 hours</b>			
Systems of Linear Equations – Matrices and Matrix Operations – Matrix					

Multiplication – The Transpose – Vectors – Determinants and Inverse of a Matrix – The Leontief Model. Linear Programming – Graphical Approach – The Duality Theorem – Matrix Formulation.			
<b>Module:8</b>	<b>Contemporary Issues</b>		<b>2 hours</b>
		<b>Total Lecture Hours</b>	<b>45 hours</b>
<b>Text Books</b>			
1.	Knut Sydsaeter, Peter Hammond, Arne Strom and Andres Carvajal (2021), Essential Mathematics for Economic Analysis. Pearson, Sixth Edition.		
<b>Reference Books</b>			
1.	Chiang, Alpha C and Kevin Wainwright (2017), Fundamental Methods of Mathematical Economics. McGraw Hill Education, 4 <sup>th</sup> Edition.		
2.	Simon C P and Lawrence Blume (2018), Mathematics for Economists, Viva Norton Student Edition.		
3.	Dowling, Edward T (2011), Shaum's Outline Series on Introduction to Mathematical Economics. McGraw Hill, 3 <sup>rd</sup> Edition.		
<b>Mode of Evaluation : CAT, Quiz, Assignment and FAT</b>			
Recommended by Board of Studies		23-02-2023	
Approved by Academic Council		No. 69	Date 16-03-2023