



SYMBIOSIS COLLEGE OF ARTS & COMMERCE
 An Autonomous College | Under Savitribai Phule Pune University
 Reaccredited 'A+' with 3.51 CGPA For Third Cycle By NAAC | College with Potential for Excellence

COURSE TITLE	Mathematics for Economic Analysis	
<p>Course Learning Outcomes: On successful completion of the module students will be able to:</p> <ol style="list-style-type: none"> 1. To provide a wider and deeper exposure to the Calculus of functions and their application to the discipline of Economics. 2. To help students gain an understanding of how to solve mathematical problems that are common to economic modeling. 3. To facilitate the ability of students to demonstrate the economic applications of differentiation, and use it to formulate economic problems. 4. To help in developing the ability to accurately translate complex economic problems into mathematical models and hone the skills to solve the problems through a wide array of mathematical techniques. 		
Gist of this course in maximum 3 to 4 lines	The course is based on basic calculus and application to the discipline of Economics that would enable students to comprehend mathematical modeling techniques that can be applied to various economic scenarios/problems to find solutions.	
Unit	CONTENTS OF THE COURSE	No. of Lectures
1.	1. <u>Title of the Topic: Economic Models</u> 1.1. Requisites of Mathematical Models in Economics –variables, constants, parameters, equations, identities 1.2. Set theory – Basic operations and properties, Introduction to concept of Limit Points- open and closed sets, concave and convex sets 1.3. Revisiting Functions, domain, range, types of functions, relative minima and maxima 1.4. Limits and continuity of functions	10
2.	2. <u>Title of the Topic: Static (or Equilibrium) Analysis and Comparative-Static Analysis</u> 2.1. Meaning of static analysis and Comparative-Static Analysis 2.2. Partial Market equilibrium and General Market Equilibrium 2.3. Equilibrium in National – Income Analysis 2.4. Rules of differentiation for one variable functions 2.5 Rules of differentiation for two variable functions 2.6 Partial and Total Derivatives, Higher order derivatives	12
3.	3. <u>Title of the Topic: Optimization Problem</u> 3.1 Concept of optimal and extreme values, relative maximum and minimum 3.2 First and Second order conditions in relation to maxima, minima, Concepts of quasi- concavity, quasi-convexity.	14

	<p>3.3 Unconstrained optimization –first and second order conditions</p> <p>3.4 Linear homogeneous functions: Cobb -Douglas Function and Elasticity of Substitution</p> <p>3.5 Lagrange Method of Constrained Optimization, Envelop Theorem and Roy’s Identity</p> <p>3.6 Applications – Utility Maximization, Cost Minimization, Output Maximization</p>	
4.	<p>4. <u>Title of the Topic: Linear Models and Matrix Algebra:</u></p> <p>4.1 Basic Properties of Determinants</p> <p>4.2 Matrix Inversion</p> <p>4.3 Cramer’s Rule: Homogenous equation system</p> <p>4.4 Applications: National-Income Model and IS-LM Model (Closed Economy)</p> <p>4.5 Leontief Input-Output Model</p>	12
5.	<p>5. <u>Title of the Topic: Dynamic analysis</u></p> <p>5.1 Meaning of Dynamic analysis</p> <p>5.2 Dynamics and Integration – definite and indefinite integrals</p> <p>5.3 First and Second order differential equations</p> <p>5.4 Difference equations</p> <p>5.5 Applications – Harrod-Domar and Solow’s Model</p>	12
	Total Number of Lectures	60
Teaching Methodology:	<p>1. Technology Enabled Learning</p> <p>2. Class Discussions</p> <p>3. Analytical Thinking</p>	
<p>Recommended Readings:</p> <ol style="list-style-type: none"> 1. Simon, C. and L. Blume, <i>Mathematics for Economists</i>, Norton, London, 1994 2. Chiang, A. C., <i>Fundamental Methods of Mathematical Economics</i>, McGraw-Hill,1984 3. Sydsaeter, K. and P. J. Hammond, <i>Mathematics for Economic Analysis</i>, Pearson, Education Asia, 1995 4. Dowling, Edward T. <i>Introduction to Mathematical Economics</i>. Tata McGraw-Hill Edition 5. <i>Mathematics for Economics</i>, third edition by Michael Hoy, John Livernois, Chris McKenna, Ray Rees and Thanasis Stengos , mitpress 6. Renshaw, G. <i>Maths for Economics</i> (2nd Edition, Oxford University Press, 2009) <p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. Roberts B. and D.L. Schultze, <i>Modern Mathematics and Economic Analysis</i>, W.W. Norton and Company, 1973 2. Intriligator, M.D., <i>Mathematical Optimization and Economic Theory</i>, Prentice-Hall, 1971 		