Symbiosis College of Arts and Commerce

(An Autonomous College Affiliated to University of Pune)

Subject code		Semester	I	II	III	IV	**V**	VI	M.Com.	I	II	III	IV

Title of Subject (For F.Y. as appeared in the prospectus) (For S.Y. & T.Y. titles can be as per the approval of BOS)	**Mathematics for Economics: Theory and Applications** **T.Y.BA Semester V Special Paper 6**
Objectives	1. To demonstrate fundamental knowledge and understanding of the principles and nature of mathematics. 2. To develop the ability to see connections between mathematical notions and applications and to formulate precise and relevant mathematical statements and questions 3. To make the students proficient in using mathematical tools for understanding basic concepts in economics.

Detailed syllabus

Unit	Contents of the syllabus	Number of Lectures
1	**1. Functions, Limits and Continuity**	**12**
	1.1 Types & Graphical Representation of functions	
	1.2 Increasing and decreasing functions	
	1.3 Minima and maxima (Absolute and Relative)	
	1.4 Limits – Rationalization, Substitution, L'Hopital's Rule	
	1.5 Continuity	
2	**2. Derivatives**	**14**
	2.1 Derivative of a function	
	2.2 Rules for Differentiation	
	2.3 Differentiation of Implicit Functions	
	2.4 Concepts of Average and Marginal Change	
3	**3. Simultaneous equations**	**5**
	3.1 Solving Simultaneous Equations- Substitution & Elimination Method	
	3.2 Solving Demand and Supply Functions	
	3.3 Concept of Price controls	
	3.4 Calculations of Consumer & Producer Surplus	
4	**4. Fundamentals of Matrix Algebra**	**15**
	4.1 Types and Basic Matrix Operations	
	4.2 Adjoint and Inverse of a Matrix	
	4.3 Solution of Linear Equations – Cramer's Rule, Gauss Elimination	
	4.4 Introduction to Input-Output Analysis	
5	**5. Game Theory**	**8**
	5.1 Pure and Mixed Strategy Solutions	
	5.2 Two person zero sum game	
	5.3 Prisoner's Dilemma, Nash Equilibrium	
	Total No. of Lectures	**54**

Learning Outcomes

- To develop analytical and logical thinking among students.
- To apply mathematical concepts to economic theory and analysis.
- To acquire practical insights of various mathematical concepts.

Suggested Readings/References:

- R K Ghosh and Saha (2002), 'Business Mathematics and Statistics'.
- Chiang A.C. & Wainwright (2005), 'Fundamental Methods of Mathematical Economics'. McGraw Hill New Delhi.
- Simon and Blume, 'Mathematics for Economists', TBS.
- Maity and Ghosh (2008), 'An Introduction to Differential Calculus', New Central Book Agency Pvt. Ltd.
- B.M Aggarwal (2009), 'Business Mathematics and Statistics', Ane Books Pvt. Ltd.
- Thomas Webster (2009), 'Introduction to Game Thoery in Business Statistics and Economics', Segment Books, New Delhi.
- Allen R.G.D (2015), 'Mathematical Analysis for Economists', Macmillan Press, London
- D. Bose (2015), 'An Introduction to Mathematical Economics', Himalya Publishing House.
- Sydaester and Hammod (2016), 'Essential Mathematics for Economic Analysis', Pearson Education Limited
- Archibald & Lipsey, 'An Introduction to a Mathematical Treatment of Economics', Littlehampton Book Services Ltd.
- Neumann and Morgenstern, 'Theory of Games and Economic Behavior', Princeton University Press.