Semester II
B.A. (Honours) Economics
C 4: MATHEMATICAL METHODS IN ECONOMICS - II (6 Credits)
Full marks: 100 (Mid Term-20 + End Term-80)

Course Description

This course is the second part of a compulsory two-course sequence. This part is to be taught in Semester II following the first part in Semester I. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general.

	Units	No of Lecture Hours	No of Tutorial Hours	Marks
1.	**Difference equation:** First order Difference equation and its Economic Applications.	10	2	12
2.	**Linear Algebra (Matrices and Determinants):** Systems of linear equations: properties of their solution sets; matrices-elementary operations matrix addition, product, rank of a matrix, determinants and their properties, inverse of a matrix, application of Cramer's rule for solution of a system of linear equations.	15	3	16
3.	**Derivatives of Functions of several variables:** Differential Calculus and its Economic Applications: Concept of Differentiation, Geometric interpretation of derivative; Partial and Total differentiation; Applications of differentiation – Elasticity of demand, Cost and Revenue functions; Relation between Average and Marginal Costs, Application to comparative static analysis of market model and national income model; Indifference curve analysis; Application to Consumer's and Producer's equilibrium; Expansion Path. Production Function Analysis- Homogeneous Functions and Euler's Theorem; Cobb-Douglas Production Function and its Properties; CES Production Function and its properties.	20	4	20
4.	**Unconstrained optimization :** Unconstrained optimization with one variable and Economic Applications; Unconstrained optimization with more than one variable and Economic Applications- Discriminating Monopoly,	15	3	16

	multiproduct monopoly.			
5	**Constrained optimization with equality constraints:** Lagrange characterization using calculus; applications- consumer's equilibrium and producer's equilibrium.	**15**	**3**	16
Total		**75**	**15**	**80**

Reading list:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia: Delhi, 2002.
2. Chiang, A.C.: *Fundamental Methods of Mathematical Economics*, Fourth edition, McGraw Hill 2005.
3. Hoy, M., J. Livernois, C. McKena, R. Rees, and T. Stengos: *Mathematics for Economics*, PHI Publishers.
4. Barua, Srinath: *Basic Mathematics and Its Applications in Economics*, Second Edition, Laxmi Publications 2013.