Eco. Sem. II.

Semester: II

Core Economics Course 4: MATHEMATICAL METHODS IN ECONOMICS–I

Course Code: IGECO17C22

Credits: 06

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. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Outline

Unit 1. Linear algebra

Matrix representations and elementary operations; Matrix inversion; Rank of a matrix; Systems of linear equations: properties of their solution sets; Determinants: properties and applications. Solution of a system of linear equations using matrices; Solution of simultaneous equations through Cramer's rule.

Unit 2. Differential Equations

Concepts; Power and order of Differential Equations; Solutions of first order differential equations; Complementary function and Particular integral.

Unit 3. Difference Equations

Concepts; Solutions of first order difference equations; Applications of difference equation– phase diagram, stability conditions.

Unit 4. Multi-variable optimization

Convex sets; convex functions, their properties and applications; quasiconvexfunctions, their characterizations, properties and applications; unconstrained optimization: characterizations using calculus and applications; constrained optimization with equality constraints: Lagrange characterization using calculus and applications.

Unit 5: Tutorial 1

a) Group discussion: different topics related to course content
b) Presentations: different topics related to course content
c) Class test

Unit 6: Tutorial 2

a) Home Assignment
b) Viva Voce

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson