ECO-HC-1026: MATHEMATICAL METHODS IN ECONOMICS–I

Course Description

This is the first of a compulsory two-course sequence. 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

1. Preliminaries

Sets and set operations, relations and functions, number system

2. Functions of one real variable

Elementary types of functions: quadratic, polynomial, power, exponential, logarithmic, convex, quasi-convex and concave functions, limit and continuity of functions

3. Differential calculus

Differentiation of a function, Basic rules of differentiation, partial and total differentiation, second and higher order derivatives for single variable, economic applications of differentiation

4. Single variable optimization

Local and global optima: geometric characterization, characterization using calculus: tests for maximization and minimization, applications: profit maximization, cost minimization, revenue maximization

5. Integration of functions

Meaning and significance of integration, basic rules of integration, significance of a constant after integration, applications: derivations of total functions (total cost, total revenue, consumption and

saving functions) from marginal functions, consumer's surplus and producer's surplus, problemsrelating to investment and capital formation

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson EducationalAsia: Delhi, 2002

2. Chiang A.C. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, McGrawHill International Edition

3. Baruah S.N., *Basic Mathematics and its Economic Applications*, MacMillan