

**Semester I**  
**B. A. (Honours) Economics**  
**C 2: MATHEMATICAL METHODS IN ECONOMICS–I (6 Credits)**  
**Full marks: 100 (Mid Term-20 + End Term-80)**

**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.

<b>Units</b>		<b>No of Lecture Hours</b>	<b>No of Tutorial Hours</b>	<b>Marks</b>
<b>1.</b>	<b>Preliminaries</b> Logic and proof techniques; number systems, intervals; sets: types and set operations; Ordered pairs, Cartesian products, and relations.	<b>15</b>	<b>3</b>	<b>16</b>
<b>2.</b>	<b>Functions of one real variable</b> Functions and their properties and graphs; Types of functions-polynomial, rational, exponential, logarithmic; Sequences and series: convergence, algebraic properties and applications; Limit of a function; Continuous functions: characterizations, properties with respect to various operations and applications.	<b>15</b>	<b>3</b>	<b>16</b>
<b>3.</b>	<b>Derivative for Functions of One Variable</b> Differentiable functions: properties; derivative and slope of a curve, Rules of differentiation for a function with one independent variable; Application of derivatives; Second and higher order derivatives. Necessary condition for unconstrained maxima and minima, second order conditions.	<b>15</b>	<b>3</b>	<b>16</b>
<b>4.</b>	<b>Integration of functions</b> Indefinite integrals: Rules of integration; Techniques of integration- substitution rule, integration by parts and partial fraction. Applications to economic problems; Derivation of total functions from marginal functions Definite integrals; properties of definite integrals; Application in case of consumer's surplus and producers surplus.	<b>15</b>	<b>3</b>	<b>16</b>
<b>5</b>	<b>Differential Equations:</b> Linear first order differential equation with constant coefficient and constant term Economic applications.	<b>15</b>	<b>3</b>	<b>16</b>
<b>Total</b>		<b>75</b>	<b>15</b>	<b>80</b>

**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.