

## **Paper 01: INTRODUCTORY MICROECONOMICS**

### **Course Description**

This course is designed to expose first-year students, who may be new to economics, the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyse real-life situations.

### **Course Outline**

#### **1. Exploring the subject matter of Economics**

Why study economics? The scope and method of economics; scarcity and choice; questions of what, how and for whom to produce and how to distribute output; the basic competitive model; prices, property rights and profits; incentives and information; rationing; opportunity sets; economic systems; reading and working with graphs.

#### **2. Supply and Demand: How Markets Work, Markets and Welfare**

Individual demand and supply schedules and the derivation of market demand and supply; shifts in demand and supply curves; the role prices in resource allocation; the concept of elasticity and its application; consumer and producer surplus; taxes and their efficiency costs

#### **3. Households**

The consumption decision: preferences and their representation with indifference curves; budget constraints; a consumer's optimum choice; income and substitution effects; labour supply and savings decisions.

#### **4. Firms and Perfect Market Structure**

Behaviour of profit maximizing firms and the production process; short-run costs and output decisions; costs and output in the long run.

#### **5. Imperfect Market Structure**

Monopoly and anti-trust policy; government policies towards competition; imperfect competition.

#### **6. Input Markets**

Labour and land markets; concepts of derived demand, input productivity and marginal revenue product and input demand curves; competitive input markets and public policy.

### **Readings**

1. Karl E. Case and Ray C. Fair, *Principles of Economics*, Pearson Education, Inc., 8<sup>th</sup> edition, 2007.
2. N. Gregory Mankiw, *Economics: Principles and Applications*, India edition by South Western, a part of Cengage Learning, Cengage Learning India Private Limited, 4<sup>th</sup> edition, 2007.
3. Joseph E. Stiglitz and Carl E. Walsh, *Economics*, W.W. Norton & Company, Inc., New York, International Student Edition, 4<sup>th</sup> edition, 2007.

## **Paper 02: STATISTICAL METHODS IN ECONOMICS –I**

### **Course Description**

This is the first of a two-part sequence on statistical methods. It begins with some basic concepts and terminology that are fundamental to statistical analysis and inference. It then develops the notion of probability, followed by probability distributions of discrete and continuous random variables. The semester concludes with a discussion of joint distributions.

### **Course Outline**

#### **1. Introduction and Overview**

The distinction between populations and samples and between population parameters and sample statistics; the use of measures of location and variation to describe and summarize data; population moments and their sample counterparts.

#### **2. Elementary Probability Theory**

Sample spaces and events; probability axioms and properties; counting techniques; conditional probability and Bayes' rule; independence.

#### **3. Random Variables and Probability Distributions**

Defining random variables; probability distributions; expected values of random variables and of functions of random variables; properties of commonly used discrete and continuous distributions (uniform, binomial, normal, poisson and exponential random variables).

#### **4. Random Sampling and Jointly Distributed Random Variables**

Density and distribution functions for jointly distributed random variables; computing expected values; covariance and correlation coefficients.

### **Readings:**

1. Jay L. Devore, *Probability and Statistics for Engineers*, Cengage Learning, 2010.
2. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.
3. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications*, Prentice Hall, 2011.

## **Paper 03: 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**

Logic and proof techniques; sets and set operations; relations; functions and their properties; number systems.

#### **2. Functions of one real variable**

Graphs; elementary types of functions: quadratic, polynomial, power, exponential, logarithmic; sequences and series: convergence, algebraic properties and applications; continuous functions: characterizations, properties with respect to various operations and applications; differentiable functions: characterizations, properties with respect to various operations and applications; second and higher order derivatives: properties and applications.

#### **3. Single-variable optimization**

Geometric properties of functions: convex functions, their characterizations and applications; local and global optima: geometric characterizations, characterizations using calculus and applications.

#### **4. Integration of functions**

Areas under curves; indefinite integrals; the definite integral.

#### **5. Difference equations**

First order difference equations.

#### **Readings:**

K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia, Delhi, 2002.

**PAPER 04**

**CONCURRENT - QUALIFYING  
LANGUAGE**