

# Syllabus for the Proposed Undergraduate Course in BSc Economics, Gokhale Institute of Politics and Economics

<b>Semester-wise breakup of Credits</b>	<b>3</b>
<b>1.1 Introduction to Calculus for Economics</b>	<b>5</b>
<b>1.2 Introduction to Statistics with Spreadsheet &amp; SPSS</b>	<b>6</b>
<b>1.3 Basic Financial Tools</b>	<b>8</b>
<b>1.4 Data Management</b>	<b>9</b>
<b>1.5 Principles of Economics</b>	<b>10</b>
<b>1.6 Communication and Presentation Skills</b>	<b>11</b>
<b>2.1 Principles of Microeconomics</b>	<b>13</b>
<b>2.2 Intermediate statistics</b>	<b>15</b>
<b>2.3 Intermediate Calculus for Economics</b>	<b>17</b>
<b>2.4 Business Communication</b>	<b>19</b>
<b>2.5 Cost and Management Accounting</b>	<b>20</b>
<b>2.6 Introduction to Sociology</b>	<b>21</b>
<b>3.1 Demography</b>	<b>22</b>
<b>3.2 Principles of Macroeconomics</b>	<b>24</b>
<b>3.3 The Interplay of Economic Theory and Data</b>	<b>25</b>
<b>3.4 Introduction to Theory of Econometrics</b>	<b>26</b>
<b>3.5 Operations Research</b>	<b>27</b>
<b>3.6 Intermediate Microeconomics</b>	<b>29</b>
<b>4.1 An Introduction to Marketing and Pricing Strategy</b>	<b>31</b>

<b>4.2 Intermediate Macroeconomics</b>	<b>33</b>
<b>4.3 Econometrics with R and Python</b>	<b>35</b>
<b>4.4 Indian Economy 1947-1991</b>	<b>36</b>
<b>4.5 Development Economics</b>	<b>38</b>
<b>4.6 Research Methodology</b>	<b>40</b>
<b>5.1 Advanced Analytics Using R and Python</b>	<b>41</b>
<b>5.2 International Trade: Pure Theory</b>	<b>42</b>
<b>5.3 Urban Economics</b>	<b>43</b>
<b>5.4 Indian Economy Post 1991</b>	<b>45</b>
<b>5.5 Money Banking &amp; Financial Markets</b>	<b>48</b>
<b>6.1 Strategy and Game Theory</b>	<b>50</b>
<b>6.2 Behavioral Economics</b>	<b>51</b>
<b>6.3 History of Economic Thought</b>	<b>53</b>
<b>6.4 Environmental Economics</b>	<b>54</b>
<b>6.5 Energy Economics</b>	<b>56</b>

### Semester-wise breakup of Credits

No.	Semester	Subject	Credits
1	1.1	Introduction to Calculus for Economics	4
2	1.2	Introduction to Statistics using Spreadsheets and SPSS	4
3	1.3	Basic Financial Methods	4
4	1.4	Data Management	4
5	1.5	Principles of Economics	4
6	1.6	Presentation and Communication Skills	2
7	1.7	Foreign Language - 1 (French and Chinese)	2
<b>Semester 1 Total Credits</b>			<b>24</b>
8	2.1	Principles of Microeconomics	4
9	2.2	Intermediate Statistics Using Spreadsheets and SPSS	4
10	2.3	Intermediate Calculus for Economics	4
11	2.4	Business Communication	2
12	2.5	Introduction to Management & Cost Accounting	4
13	2.6	Introduction to Sociology	4
14	2.7	Foreign Language - 2 (French and Chinese)	2
<b>Semester 2 Total Credits</b>			<b>24</b>

15	3.1	Demography	4
16	3.2	Principles of Macroeconomics	4
17	3.3	The Interplay of Economic Theory and Data	2
18	3.4	Introduction to theory of econometrics	4
19	3.5	Operations Research	4
20	3.6	Intermediate Microeconomics	4
21	3.7	Foreign Language - 3 (French and Chinese)	2

<b>Semester 3 Total Credits</b>			<b>24</b>
22	4.1	Marketing Theory and Pricing Strategies	2
23	4.2	Intermediate Macroeconomics	4
24	4.3	Econometrics with Case Studies using R and Python	4
25	4.4	The Indian Economy: 1947-1991*	4
27	4.5	Development Economics	4
28	4.6	Research Methodology using Real World Projects	4
29	4.7	Foreign Language - 4 (French and Chinese)	2
<b>Semester 4 Total Credits</b>			<b>24</b>
30	5.1	Advanced Analytics (ML,DL, AI and NN) Using R and Python	4
31	5.2	Pure Theory of Trade	4
32	5.3	Urban Economics	4
33	5.4	The Indian Economy: 1991 - Present Day	4
34	5.5	Banking and Finance	4
35	5.6	<b>Analytics Project Work</b>	2
36	5.7	Foreign Language - 5 (French and Chinese)	2
<b>Semester 5 Total Credits</b>			<b>24</b>
37	6.1	Strategy and Game Theory	4
38	6.2	Behavioral Economics	4
39	6.3	Schools of Economic Thought	4
40	6.4	Energy Economics	4
41	6.5	Environmental Economics	4
42	6.6	Foreign Language - 6 (French and Chinese)	4
<b>Semester 6 Total Credits</b>			<b>24</b>
<b>Total Credits</b>			<b>144</b>

## **1.1 Introduction to Calculus for Economics**

### **Objective**

The goal of this course is to give the students sufficient knowledge of fundamental principles, methods and a clear perception of calculus and to equip students with necessary analytic and technical skills to handle problems of mathematical nature.

### **Module 1 (6Hrs)**

The Algebraic and Order Properties of  $\mathbb{R}$ , Absolute Value and the Real Line, The Completeness Property of  $\mathbb{R}$ , Applications of the Supremum Property, Introduction to Set Theory. Intervals: Open and closed intervals, Complex numbers, Inequalities etc

### **Module 2 (6 Hrs)**

Sequences and Their Limits, Limit Theorem, Monotone Sequences, Subsequences and the Bolzano-Weierstrass Theorem, The Cauchy Criterion, Properly Divergent Sequences, Introduction to Infinite Series, Geometric Series,

### **Module 3 (8 Hrs)**

Limits of Functions, Limit Theorems, Some Extensions of the Limit Concept Continuous Functions, Combinations of Continuous Functions, Continuous Functions on Intervals, Uniform Continuity, Continuity and Gauges, Monotone and Inverse Functions

### **Module 4 (20 Hrs)**

The Derivative, The Mean Value Theorem, L'Hospital's Rules, Rules of differentiation, Partial Differentiation, Taylor's Theorem Taylor's theorem, Taylor series, Maclaurin Series, Exponential Series, Taylor's theorem for several independent variables

### **Recommended Readings:**

- W. Rudin, Principles of Mathematical Analysis, Third Edition, McGraw-Hill, 1976
- Tom M. Apostol, Calculus Volume I, Second Edition, John Wiley and Sons, Inc.
- Robert G. Bartle and Donald R. Sherbert, Introduction to Real Analysis, Third Edition, John Wiley and Sons, 2002.
- R. Courant and F. John, Introduction to Calculus and Analysis, Vol. 1, Reprint of the first Ed., Springer Verlag, New York, 1999..
- B. Thomas and R. L. Finney, Calculus and Analytic Geometry, 9th ed., Addison-Wesley/Narosa, 1998.

## **1.2 Introduction to Statistics with Spreadsheet & SPSS**

### **Objective**

Objective of this course is to familiarize students with basic statistical tools and its application. The aim is to train students intensively in both theoretical and practical aspects of statistics, to bring them in contact with basic concepts and methods and to create a problem-solving attitude with the aid of statistical methodology.

### **Module 1 (10 Hrs)**

Definition and Importance of statistics, Types of data: nominal, ordinal, interval and ratio scale, variables: discrete and continuous variables. Case Study: interpret questionnaires, basic analysis of data types, Understanding the difference between factors and levels (in the context of SPSS) Construction of tables (with one or more factors and levels), diagrammatic and graphical representation of data (Bar chart, pie chart), frequency and cumulative frequency distribution and their applications, histogram, frequency polygon, frequency curve, ogives, stem and leaf charts, box plot; examples and problems.

### **Module 2 (10 Hrs)**

Concept of central tendency and its measures, partition values, dispersion and relative dispersion, coefficient of variation, moments up to fourth order and their measures uses and limitations. Linking of data, their graphs, their interpretations and relevant applications

### **Module 3 (15 Hrs)**

Principle of counting, permutation, combination, Sample space and events and random variable, generating a random variable, Elements of probabilities, classical and statistical definition of probability, additive and multiplicative theorems of probability, conditional probability and Bayes theorem. Standard discrete and continuous distributions such as Binomial, Poisson and normal distributions with their properties and applications. Elementary idea of probability mass function, probability density function and distribution function.

### **Module 4 (5 Hrs)**

Bivariate Data: Scatter diagram, correlation, regression lines and their uses, Concept of error in regression, principle of least square, fitting of linear regression and related results.

### **Recommended Reading:**

- Aczel and Sounderpandian. Complete Business Statistics, 7th Edition

- Andy Field, Discovering Statistics using IBM SPSS Statistics, 4th edition, Sage Publication
- Wayne Winston, Microsoft Excel 2016 - Data Analysis and Business Modeling, Prentice Hall India

## **1.3 Basic Financial Tools**

### **Objective**

This course serves as an introductory course for non-finance background student to study finance and financial markets. The objective of this course is to help and enable the student to acquaint the working terminology of the financial world and to understand the basic techniques used by analysts working in the field of finance.

### **Module 1 (10 Hrs)**

What is Money, What is Finance, Difference between stock and flow (income, wealth, bank money, investment) Monetary assets vs financial assets, financial intermediaries, financial systems, Interface of Financial Management with Other Functional Areas Basic Financial statement Analysis: Balance Sheet Analysis; P&L Account, Ratio Analysis-Liquidity, Leverage; Turnover and Profitability ratios

### **Module 2 (10 Hrs)**

Time Value of Money: Why the time value of Money; Simple Interest and Compounded Interest; Nominal and Real Rates of Interest; Future Value- Single Cash Flow; Multiple Cash Flows and Annuity; Present Value-Single Cash flow, Multiple Cash Flows and Annuity; Growing Annuity, Perpetuity and Growing Perpetuity; Loan Amortization

### **Module 3(10 Hrs)**

Risk and Return: Concepts; Relationship Between Risk and Return; Risk Diversification; Systemic and Unsystemic risk; Measuring the Risk-Variance and Standard Deviation

### **Module IV (10 Hrs)**

Financial Securities: Bonds and Equities- Features; Types; Interest Rates and Yields, Current Yield; Yield to Maturity; Duration

### **Recommended Reading:**

- Drake P.P and Fabozzi, F.J (2010). The Basics of Finance: An Introduction to Financial Markets, Business Finance, and Portfolio Management (Frank J. Fabozzi Series), John Wiley & Sons.
- Shim, J.K and Spiegel, J.G. (2009). Financial Management, 3<sup>rd</sup> Edition, Schaum's Outlines Graw-Hill Education.
- Pandey, I.M (2018). Financial Management, 11th Edition, Vikas Publishers.



## **1.4 Data Management**

### **Objective**

To equip students with cutting edge knowledge about processes to capture, store, retain and extract data in modern corporations = to equip students with the basics of SQL and associated data extraction languages

### **Module 1 (5 Hours)**

RDBMS Concepts - Tables, Rows, Fields, Data Types - Data Normalization - Database design - Create, Alter and Drop Database - Create, Alter and Drop Table

### **Module 2 (8 Hours)**

Data Loading - Inserting Records - Update/Modify Data - Select queries - Aggregations - Joins - Inner/Outer - Built-In functions - Create and use Views - Temporary Tables - Unions - Subqueries/Nested queries - Performance Tuning

### **Module 3 (12 Hours)**

What is Data Warehousing? - Types of Data Warehouse - General Stages in Data Warehouse - Importance of Data Warehouse in Enterprises - Characteristics of Data Warehouse - Components of Data Warehouse - Data Warehouse Terminology and Concepts - Three-tier Architecture - Data Warehouse Best Practices - Process Overview - Steps in ETL - ETL Tools - Overview - ETL vs ELT

### **Module 4 (15 Hours)**

Data Models - Concepts, Overview - Introduction to OLAP - Types of OLAP Systems  
Basic Analytical Operations in OLAP - OLTP vs OLAP - Differences - Elements of Dimensional Data Model - Steps of Dimensional Modelling - Types of Schema - What is a Data Mart? - Need for a Data Mart - Types of Data Mart - Implementation Steps - Data Mart Vs Data Warehouse - Differences - What is a Data Lake - Necessity of a Data Lake - Key Concepts of Data Lake - Data Lake vs Data Warehouse - What is BI? - Importance of BI - DW and BI Tools today

## **1.5 Principles of Economics**

### **Objective**

To equip students with the basic ideas and principles of economics, and to explain their relevance and importance to every single walk of life.

### **Module 1 (12 Hrs)**

Choices - Menu of choices - Thinking about choices - Defining a choice set - Costs - Opportunity costs - Sunk Costs - Incentives - Understanding incentives - Designing incentives - The limitations of incentives - negative incentives - the limitations of negative incentives - horizons - thinking about short vs long term horizons

An introduction to concepts in economics - their meaning - their etymology - their definition - their limitations

### **Module 2 (10 Hrs)**

Trade - games - zero sum games - non-zero sum games - economics as a non zero-sum game - the importance of markets - the evolution of markets - the evolution of trade - prices, information and action - the importance of property rights

### **Module 3 (8 Hrs)**

Externalities - unintended consequences - shadow pricing - the role of government - the theory of the second best - what are the alternatives - Information asymmetry - moral hazard - adverse selection - competition - monopoly - network effects - technology and economics

### **Module 4 (10 Hours)**

Money - the evolution of money - debt, trade and money - inflation - its measurement and its problems - unemployment - types, measures and problems - measuring growth, the difficulty and the necessity

### **Recommended Readings:**

- Robert Frank, The Economic Naturalist
- John Macmillan, Reinventing the Bazaar – A Natural History of Markets
- David Graeber, Debt
- Tyler Cowen, Discover Your Inner Economist
- Satish Deodhar, Everyday Economics

## **1.6 Communication and Presentation Skills**

### **Objective**

Communication is the undisputed key to success and confidence in communication is the knowledge to use the Right Key for the Right Lock. Public Speaking, however significant, is the second highest dreaded thing worldwide. Presentation is one of the most popular ways to communicate, especially in professional setup and yet many students are not familiar with the Essentials of an Impactful Presentation. This course capsule shall allow students to understand and experience the significance of effective Communication and Presentation Skills, which are the cornerstone for professional and personal success. Through this highly interactive and exercise based course, we will prepare the students in Expressing themselves clearly and confidently, structuring their thoughts in the Right Manner and find out their strengths for an impactful interaction.

### **Module 1 (10 Hours)**

Understanding Communication the Right Way - Process, Functions, Characteristics and Types of Communication Responsibilities of Sender and Receiver for an effective communication Essentials of Communication Choosing the Right Channels, Modes for different types of Communication agenda Listening Skills

Understanding Communication the Right Way - Process, Functions, Characteristics and Types of Communication Responsibilities of Sender and Receiver for an effective communication. Essentials of Communication - Choosing the Right Channels - Modes for different types of Communication agenda Listening Skills.

### **Module 2 (10 Hours)**

Barriers to Effective Communication - Individual Barriers to communication - Process barriers to communication - How to overcome barriers - Concept of Grapevine and how to avoid it. Strategic Communication - Communicating with Different demographics - Communicating in Cross-cultural setting - Communicating in Difficult Situations and conflicts Polishing the Communication Skills in Knowledge Economy - Technology in Communication - Symbolisms in Communication - Pitch, Tone and Modulation

### **Module 3 (10 Hours)**

Anatomy of a Successful Presentation - Fundamental Principles of Presentation - Expressions, Self-Awareness and Structure of the Presentation - Understanding your speech strength as a presenter Psychologically prepping your presentation - Confidence Building and Positive Self Talk - Toning the Central Message, Introduction and Conclusion effectively for Strong Start and End - Effective Stage Presence and Pretext setting - Understanding your audience ,their needs and characteristics

#### **Module 4 (10 hours)**

Presenting: Effective Visual Aids- PPTs, Videos and other Tools - Avoiding Too Much, Too Less, Too Soon and Too Late part of message - Body Language and Voice Command - Controlling buffer words.

Improving your presentation: Strengthening content through Emotions, Actions, Analogies Word play and involvement - Managing Audience interactions - How and when to use humour in presentation

#### **Recommended Reading:**

- Organizational Behaviour (Reference Book) by Stephan P. Robbins
- Personnel Management (Reference Book) by C.B. Memoria
- Case Studies, Articles, Exercises and Live Projects (Activities)
- Practical through newspaper readings, articles, blogs, books and other reading materials
- Confessions of a Public speaker (Management Book) by Scott Berkun
- Speak to Win (Management Book) by Brain Tracy
- Videos, Audios, Speeches, Writings and other material for exercises
- Practical through newspaper readings, articles, blogs, books and other reading materials

## 2.1 Principles of Microeconomics

### Objective

This course is designed to expose the students to 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 analyze real-life situations.

### Module 1 (6 hours)

Why study economics? Scope and method of economics; the economic problem: scarcity and choice; the question of what to produce, how to produce and how to distribute output; science of economics; the basic competitive model; prices, property rights and profits; incentives and information; rationing; opportunity sets; economic systems; reading and working with graphs.

### Module 2 (10 hours)

Markets and competition; determinants of individual demand/supply; demand/supply schedule and demand/supply curve ;concept of equilibrium, market versus individual demand/supply; shifts in the demand/supply curve, demand and supply together; how prices allocate resources; elasticity and its application; controls on prices; taxes and the costs of taxation; consumer surplus; producer surplus and the efficiency of the markets.

### Module 3 (14 hours)

The consumption decision - budget constraint, consumption and income/price changes, demand for all other goods and price changes; description of preferences (representing preferences with indifference curves); properties of indifference curves; consumer's optimum choice; income and substitution effects; Hicksian and Slutsky method of decomposition , labour supply and savings decision - choice between leisure and consumption, the theory of revealed preference

### Module 4 (10 hours)

Behaviour of profit maximizing firms and the production process; Concept of Iso-quant, firm's equilibrium, Concept of costs- fixed cost, variable cost, average cost, marginal cost, short run costs and output decisions; costs and output in the long run.

### Recommended Reading:

- Karl E. Case and Ray C. Fair, *Principles of Economics*, Pearson Education Inc.,
- N. Gregory Mankiw, *Economics: Principles and Applications*, India edition by South Western, a part of Cengage Learning, Cengage Learning India

- Hal R. Varian, Intermediate Microeconomics, a Modern Approach, W.W. Norton and Company/Affiliated East-West Press (India)
- Ferguson, C. E. and Gould, J.P., Microeconomic Theory, Aitbs Publishers and Distributors,
- Cohen, K.J. and Cyert, R.M., Theory of the Firms: Resource Allocation in a Market Economy

## **2.2 Intermediate statistics**

### **Objective**

To use forecasting and data analysis techniques in case of univariate and multivariate data sets. To test the hypotheses particularly about mean, variance, correlation, proportions, To study applications of statistics in the field of economics, demography etc.

### **Module 1 (4 Hrs)**

Expectation of random variable and its properties, conditional expectation, moment in terms of expectation, moment generating function of a random variable, their properties and uses, probability generating function, Tchebycheff's inequality and its applications, convergence in probability and in distribution.

### **Module 2 (8 Hrs)**

Estimator and estimate, properties of estimators (definition and illustrations only), Tests of statistical inference - Hypothesis: Statistics and parameters, null and alternative hypothesis, one sided and two sided alternative hypothesis, critical region, type I error, type II error, level of significance, p-value. Confidence interval with relevant case studies

### **Module 3 (16 Hrs)**

Normal distribution, the standard normal, the z-test, Tests for differences of means using the t-test, F-test [using relevant SPSS modules], using critical region approach and p-value approach

### **Module 4 (12 Hrs)**

Time Series Meaning and utility of time series, Components of time series; trend, seasonal variations, cyclical variations, irregular (error) fluctuations or noise, Methods of trend estimation and smoothing : (i) moving average, (ii) curve fitting by least square principle, (iii) exponential smoothing. Measurement of seasonal variations (i) simple average method, (ii) ratio to moving averages method, Forecasting, Index Numbers - Laspeyere's, Paarsche, Splicing and linking

### **Recommended Reading:**

- Anderson, Sweeney and Williams, Statistics for Business and Economics, 12th Edition, Cengage India
- Aczel and Sounderpandian. Complete Business Statistics, 7th Edition
- Andy Field, Discovering Statistics using IBM SPSS Statistics, 4th edition, Sage Publication

- Wayne Winston, Microsoft Excel 2016 - Data Analysis and Business Modeling, Prentice Hall India



## 2.3 Intermediate Calculus for Economics

### Objective

Ordinary and partial differential equations are used frequently in Economics in connection with the equilibrium and stability conditions. Determinants and matrices are used to solve systems of equations. If economists want to use time as a discrete variable, Difference equations express economic relationship more adequately than differential equations. It is expected that after completion of this paper, student would be in a better position to inter link the higher level of mathematics and its uses in Economics with logical understanding .

### Module 1 (12 Hrs)

The fundamentals of Linear (or matrix) Algebra The role of Linear algebra, Definitions and terms, Operation in and types of Matrix Matrix Inversion- Determinants and Non-singularity, Third order Determinants, Minor, cofactors and Adjoint matrices, Rank of matrices, Partitioned Matrix, Inverse matrices, Solving Linear equation with the inverse and Cramer's rule. Eigenroots and eigenvalues and their interpretations from the point of view of economic theory  
Differentiation of matrices and determinants, Idempotent matrix and matrix series, Solution of simultaneous linear & simultaneous difference equation and stability conditions, Special Determinants and matrices and their application in Economics- The Jacobian, The Hessian, Higher order hessian and Bordered Hessian

### Module 2 (10 Hrs)

Introduction, Solutions, Non-linear differential equations of the first order and first degree- Case I- Variable separable case, Case II- differential equation with homogeneous coefficients, and Case III- exact differential equations; Linear differential equation of first order, linear differential equation of second order with constant coefficient, Characteristic Roots, Conjugate Complex Numbers. and Domar's capital expansion model

### Module 3 (10 Hrs)

Finite Differences, Some operators, Difference Equations, Solutions Homogeneous linear difference equation with constant coefficients, Geometric interpretation of solutions, Particular solutions of nonhomogeneous linear equations, Linear first order difference equations, linear second order difference equations with constant coefficients, Interaction between multiplier and acceleration principal, Lagged Income determination model, The Cobweb model and the Harrod Model

### Module 4 (8 Hrs)

Dynamic Optimization, Distance between Two points on a plane, Euler's Equation and Conditions for Dynamic Optimization, finding Candidates for Extremals, Dynamic optimization subject to Functional Constraints, Vibrational Notation

**Recommended Reading:**

- Taro Yamane (1975), *Mathematics for Economists: An Elementary Survey*, 2<sup>nd</sup> edition, PHI, Tokyo
- Dowling T Edward (1992), *Introduction to Mathematical Economics*, 2<sup>nd</sup> edition, Mcgrahill, INC.
- Alpha C. Chiang and Kevin Wainwright, *Fundamental Methods of Mathematical Economics*, 4th Edition, McGrawHill

## **2.4 Business Communication**

### **Objective**

Business Communication essentially deals with more formal and responsible aspects of communication in a professional setting. Understanding how, why and when of Business Communication resolves majority of work and team related challenges in any given setup. This course aims to provide clarity to the students about the significance of Business Communication varied professional scenarios and how to deal with them. The Topics thus covered will envelop practical professional challenges and how to deal with them effectively and have a fructifying professional experience.

### **Module 1 (10 Hours)**

Understanding the Business Communication - Process, Functions, Characteristics and Types of Business Communication - Communication Network in an organization - Aids and Banes of Technology in Business Communication - Choosing the Right Channels, Modes for different types of Communication agenda - Listening Skills

### **Module 2 (15 Hours)**

Written Communication Fundamentals - Principles, Process and Events of Written Communication - Tips and Tricks for Written Communication - Writing of Business Letters, Applications, Enquires, Replies etc - Structure and Fundamentals of Report Writing and other Business Documents

### **Module 3 (15 Hours)**

Psychological and Cultural Dimensions in the Formal World - Communicating with Different Hierarchical levels Communicating in Cross-cultural setting - Handling Difficult Situations and conflicts - Communicating to convince and negotiate - Communicating for Feedback-Interviews, Group Discussions and Meetings

### **Recommended Reading:**

- Excellence in Business Communication by J.V Thill and C.L.Bovee
- Business Correspondence and Report Writing by R.E. Sharma and Krishna Mohan
- Videos, Audios, Speeches, Writings and other material for exercises
- Practical through newspaper readings, articles, blogs, books and other reading materials

## **2. 5 Cost and Management Accounting**

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### **Objective**

To equip students with the basic skills required to understand concepts in accounting, and their applicability to both economics as well as financial economics.

### **Module 1 (10Hrs)**

Management Accounting, Cost Accounting, Financial Accounting, Direct and Indirect Costs, Variable and Fixed Costs, Total Costs and Unit Costs, Prime Costs and Conversion Costs, Labour Costs, Overtime Premium and Idle Time, Calculating the costs of products and services.

### **Module 2 (10Hrs)**

Job costing, Process-costing, overhead costs and their allocation, activity-based costing, carrying costs of inventories

### **Module 3 (10Hrs)**

Basic concepts. Contribution Margin and Gross Margin Method, Break-even point and target income Operating leverage and sensitivity of costs. Cost planning

### **Module 4 (10Hrs)**

Cost-plus pricing, cost-plus target rate of return pricing, product-line pricing, standard costing, profit and responsibility centres. Strategic pricing including penetration price, skimming price, entry preventing price, charm pricing

### **Recommended Reading:**

- M. Y. Khan & P. K. Jain, Management Accounting, Tata McGraw Hill, Latest Edition
- Charles T. Horngren, Shrikant Datar, George Foster, Madhav Rajan, Christopher Ittner., Cost Accounting: A Managerial Emphasis, Pearson, Latest Edition.
- Joel Dean, Managerial Economics

## **2.6 Introduction to Sociology**

### **Objective**

This course introduces the basic concepts the classical sociological thinkers and various schools of thought. This course also aims to make students understand forces, social and political, responsible for the development of sociology in a scientific way.

### **Module 1 (10 Hrs)**

Basic Concepts in Sociology:

a) Society, b) Groups, c) Socialisation, d) social control, e) Culture, f) Multiculturalism, g) Cultural relativism, h) Ethnocentrism

### **Module 2 (10 Hrs)**

Development of Sociology: Social and Political forces: Enlightenment, French Revolution, Industrial Revolution, Intellectual forces that shaped the development of sociology

### **Module 3 (10 Hrs)**

Sociological Thinkers: Alex de Tocqueville, August Comte, Herbert Spencer, Emile Durkheim, Karl Marx, Max Weber

### **Module 4 (10 Hrs)**

Schools of Sociological Thought: Positivist School-Comte, Conflict School-Marx, Ralf Dahrendorf, Coser, Interpretative School-Weber

### **Recommended Readings:**

Haralambos and Holborn. 2007. Sociology: Themes and Perspectives. Collins, London.  
Abraham, M. F. and Morgan, J. H. 1996. Sociological Thought. Madras. MacMillan, India.  
Aron, Raymond. 1982. Main Currents in Sociological Thought. Vol. I & II. Penguin, Books. New York.  
Lewis, Coser. 1979. Masters of Sociological Thought. Harcourt, Harcourt Brace, Jovanovich. New York.  
Ken, Morrison. 1995. Marx, Durkheim, Weber: Formation of Modern Social, Thought. Sage. London.  
Ritzer, George. 6th (ed.) 1996. Sociological Theory. Tata McGraw Hill. New Delhi.  
Ray, Larry J. 2010. Theorizing Classical Sociology. Tata McGraw Hill. New Delhi.

### **3.1 Demography**

#### **Objective**

To understand the fundamentals of population studies and how it is related to other sciences and social sciences. To understand the world population scenario and sources of demographic data. To understand the important concepts of size, growth, distribution and characteristics of Indian population. To familiarize the students with the components of population change and its contribution in change over the time. To get the overview of much solicited demographic techniques of estimating life expectancy and future population size. It also includes understanding the thinking and planning about the future population by setting some short term and long term goals.

#### **Module 1 (10 Hours)**

Introduction to Demography and Population Studies, Interdisciplinary nature of Population studies, World Population growth, Sources of Data -Demographic year books, Population Census, Sample Registration System

#### **Module 2 (10 Hours)**

Population of India, Size and Growth of Indian population - Age- sex structure - Literacy - Work force - Household level, Housing, Sanitation and assists and amenities, Structure of Population, Age pyramids - Population ageing, Demographic dividend, Sex ratio, Urbanization, Population differentials by states

#### **Module 3 (12 Hours)**

Dynamics of Population Change, Fertility, Mortality, Migration

#### **Module 4 (8 Hours)**

Selected Techniques, Life Table, Population Projections, Population Policy

#### **Recommended Reading:**

- Bende, A.A. and T. Kanitkar (2014), Principles of Population Studies, Mumbai: Himalayan Publishing House.
- F. Ram and K.B. Pathak (1998): Techniques of Demographic Analysis, Himalaya Publishing house, Bombay(Chapters 2 & 3).

- Gelbard, A. C. Haub, and M.M. Kent. (1999), World Population: Beyond Six Billion. Population Bulletin, Volume 54, Number 1. Washington: Population Reference Bureau.
- Jain A.K., and P. Visaria (1988), Infant Mortality in India: Differentials and Determinants, New Delhi: Sage Publications.
- Newell, C. (1988), Methods and Models in Demography, New York: John Wiley and Sons.
- Preston, S., P. Heuveline and M. Guillot (2003), Demography: Methods and Modelling Population Processes, Oxford: Blackwell Publishers.
- Pressat, R. (1972), Demographic Analysis, Chicago: Aldine-Atherton
- Spiegelman, N. (1968), Introduction to Demography, Harvard University Press.
- Srinivasan, K. (1999), Basic Demographic Techniques and Applications, New Delhi: Sage Publications.
- Shryock, H.S. and J.S. Siegel (1976), The Methods and Materials of Demography, New York: Academic Press.
- Visaria, P. (1997), Urbanisation in India: An Overview. In Gavin W.J, and P. Visaria (Eds.), Urbanisation in Large developing Countries: China, Indonesia, Brasil, and India, Oxford, England: Clarendon Press.
- Weeks John (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.

## **3.2 Principles of Macroeconomics**

### **Objectives**

The objective of the course is to familiarize the students about the various concepts in macroeconomics. The course structure covers the major ideas in economics and intends to provide wider vision of the present discourses in macroeconomics. The course will help to develop aptitude to relate concepts with research and policy.

### **Module 1 (10 Hrs)**

The Data of Macroeconomics- Measurement of National Income; Measuring the Cost of Living The Real Economy in the Long Run- Production and Growth; Saving, Investment, and the Financial System; The Basic Tools of Finance; Unemployment

### **Module 2 (10 Hrs)**

Keynesian Cross - Basic Keynesian Concepts - An introduction to the General Theory of Interest, Unemployment and Money

### **Module 3 (10 Hrs)**

Money and Prices- The Monetary System - quantity theory of money - Measures of money supply - credit creation - Introduction to transmission mechanism for money;

### **Module 4 (10 Hrs)**

Aggregate Demand and Aggregate Supply; The Influence of Monetary and Fiscal Policy on Aggregate Demand; The Short-Run Tradeoff between Inflation and Unemployment Economic Fluctuations

### **Recommended Reading:**

- R. Dornbusch, S. Fischer, R. Startz (2012), Macroeconomics, 11th ed., Tata McGraw Hill
- Mankiw, N. Gregory (2008). Principles of Macroeconomics, 5<sup>th</sup> Edition, Cengage Learning.
- Nellis, G. Joseph and Parker, D (2004) Principles of Macroeconomics, Financial Times Prentice Hall, Pearson Education.
- Case, K. E. Fair, R. C. & Oster, S.E(2014). Principles of Macroeconomics, 10<sup>th</sup> Edition, Pearson Education.
- Suraj B. Gupta, Monetary Economics: Institutions, Theory & Policy, S. Chand (2010)



### **3.3 The Interplay of Economic Theory and Data**

#### **Objective**

What role does data play in the formulation of economic theory? How does data validate economic theory? How does new data help economists reformulate or update existing theories? Where is such data found, how can it be used, and what are the limitations of data? This course aims to equip students with the ability to think about, and to the extent possible, answer these questions - both from an India-specific perspective as well as a global perspective.

#### **Module 1 (6Hrs)**

An introduction to the role of data in economic history - the Physiocrats - Quesnay - Hume - William Petty - Kuznets modern data sources - the structure of data - an introduction to cross-sectional, longitudinal and panel data - data storage and retrieval - efficient data pulls - basic data cleaning measures in MS Excel - basic data sanitation checks in Excel - basic data-related formulas in Excel

#### **Module 2 (12 Hrs)**

India specific data sources - the role of the National Sample Survey Organization (NSSO), Central Statistical Organization (CSO), Annual Survey of Industries (ASI), Reserve Bank of India (RBI) - datasets (Employee Provident Fund Organization [EPFO], Ministry of Corporate Affairs [MCA], Database on Indian Economy, [DBIE], Census datasets) - replication of GIPE data pulling exercises, GIPE data cleaning exercises, GIPE data treatment exercises - case study

#### **Module 3 (10 Hrs)**

Global data sources - United Nations Conference on Trade and Development (UNCTAD), World Development Indicators (WDI), World Economic Outlook, Federal Reserve Economic Database (FRED) St. Louis, Eurostat - limitations of publically available data (China case study) - replication of GIPE data pulling exercises, GIPE data cleaning exercises, GIPE data treatment exercises - case study

#### **Module 4 (12 Hrs)**

Case Studies - The minimum wage controversy - the backward bending supply curve for labor - GDP calculations - inflation calculations - purchasing power parity calculations - Reinhart/Rogoff controversy

#### **Recommended Readings:**

- Wayne Winston, Data Analysis and Business Modeling (2016 Edition)
- GIPE Publications [With the aid of relevant faculty/RA's]

### **3.4 Introduction to Theory of Econometrics**

#### **Objective**

This introductory course is aimed to make student understand the theoretical aspects of regression analysis and problem associate with the same. It is expected that after completion of this course student should be able to plan and execute a research project independently.

#### **Module 1 (10 Hours)**

Review of probability and statistics: Univariate case & bivariate case Random Variables and Probability distributions, Expectation and moments.

Review of statistical inference: Sampling distributions and inference, The Central Limit theorem (Asymptotic distribution of the sample mean), Confidence intervals, testing of hypotheses

#### **Module 2 (10 Hours)**

Conditional expectation functions, bivariate regression, Sampling distribution of regression estimates; Gauss-Markov theorem, asymptotic distribution of the sample slope, Residuals, fitted values, and goodness of fit

#### **Module 3 (10 Hours)**

Multivariate regression: anatomy of multivariate regression coefficients, Specification Analysis Omission of a relevant variable Inclusion of irrelevant variable Tests of Specification Errors, Dummy variables and interactions; testing linear restrictions using F-tests

#### **Module 4 (10 Hours)**

Inference problems - heteroscedasticity and autocorrelation

Heteroscedasticity, consequences of; weighted least squares; the linear probability model

Serial correlation in time series, consequences of; quasi-differencing; common-factor restriction; Durbin-Watson test for serial correlation

#### **Recommended Readings**

- Christopher Dougherty, Introduction to Econometrics, 4th OUP, Indian edition.
- Damodar Gujarati and Dawn Porter, Essentials of econometrics, 4th edition, Mcgrawhill Education
- James H. Stock and Mark W. Watson, "Introduction to Econometrics", 3rd edition, Prentice Hall

## **3.5 Operations Research**

### **Objective**

To equip students with the basic insights of optimization, constrained optimization, and the algorithms associated with the field of operations research, including their applications.

### **Module 1**

Operations Research Models, Solving the OR Model, Queuing and Simulation Models, Art of Modeling, More than Just Mathematics, Phases of an OR Study  
Modeling with Linear Programming- Introduction, Two-Variable LP Model, Graphical LP Solution, Computer Solution with Solver and AMPL, Linear Programming Applications. The Simplex Method and Sensitivity Analysis - LP model in Equation Form, Transition from Graphical to Algebraic Solution, The Simplex Method, Artificial Starting Solution, Special Cases in the Simplex Method, Sensitivity Analysis

### **Module 2**

Duality and Post-Optimal Analysis - Definition of the Dual Problem, Primal–Dual Relationships, Economic Interpretation of Duality, Additional Simplex Algorithms, Dual Simplex Algorithm, Post-Optimal Analysis  
Bounded-Variables Algorithm, Duality, Unboundedness and infeasibility, Parametric Linear Programming  
Transportation Model and Its Variants  
Definition of the Transportation Model, Nontraditional Transportation Models, The Transportation Algorithm - Determination of the Starting Solution, Northwest-corner method, Least-cost method, Vogel approximation method (VAM), Iterative Computations of the Transportation Algorithm. Transshipment model- Simplex Method Explanation of the Method of Multipliers  
The Assignment Model  
The Hungarian Method, Simplex Explanation of the Hungarian Method

### **Module 3**

Classical Optimization Theory Unconstrained Problems, Constrained Problems -Constrained derivatives (Jacobian) method. Sensitivity analysis in the Jacobian method,; Lagrangean method - Inequality Constraints—Karush–Kuhn–Tucker (KKT) Conditions, Sufficiency of the KKT conditions. Nonlinear Programming Algorithms Unconstrained Algorithms, Constrained Algorithms- Separable Programming and Separable convex programming, Quadratic Programming, Chance-Constrained Programming, Linear Combinations Method and SUMT Algorithm.

## **Module 4**

Markov Chains: Definition of a Markov Chain, Absolute and n-Step Transition Probabilities, Classification of the States in a Markov Chain, Steady-State Probabilities and Mean Return Times of Ergodic Chains, First Passage Time, Analysis of Absorbing States. Simulation Modeling Monte Carlo Simulation, Types of Simulation - Elements of Discrete Event Simulation, Generic Definition of Events; Sampling from Probability Distributions -Inverse method, Convolution method, Box-Muller normal sampling formula. Generation of Random Numbers, Mechanics of Discrete Simulation - Manual Simulation of a Single-Server Model and Spreadsheet-Based Simulation of the Single-Server Model; Methods for Gathering Statistical Observations - Subinterval Method and Replication Method; Simulation Languages

### **Recommended Reading:**

- Hamdy Taha, Operations Research: An Introduction, 9<sup>th</sup> Edition, Pearson

### 3.6 Intermediate Microeconomics

#### Objective

The focus will be on conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers output markets, input market general equilibrium and welfare, and topics under information economics.

#### Module 1 (16 hours)

Perfect Competition, imperfect competition. Monopoly and barriers to entry- output determination and price rule, measure and sources of monopoly power, social costs of monopoly power-deadweight loss, Pricing with market power- first, second and third degree price discrimination, Monopolistic competition- short run and long run equilibrium, excess capacity, Oligopoly equilibrium as Nash equilibrium, Cournot, Bertrand and Stackelberg Model - Competition versus collusion- the Prisoners' Dilemma, Collusive Oligopoly - Cartels and Price Leadership

#### Module 2 (10 hours)

Labour and land markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for input ; input demand curves; shifts in input demand curves; competitive input markets; non competitive input market, bilateral monopoly, monopsony.

#### Module 3 (8 hours)

General Equilibrium and Economic Efficiency- Exchange, production and welfare, Pareto Optimality, Edgeworth box and contract curve, Pareto efficiency and perfect competition, Reasons for Market failure, Pareto efficiency and market failure (externalities and public goods), property right and Coase Theorem

#### Module 4 (6 hours)

Concepts of expected value and uncertainty, Markets with asymmetric information-adverse selection, moral hazards, agency problems

#### Recommended Reading:

- Pindyck, Rubinfeld and Mehta, Microeconomics, Pearson
- G.S.Maddala and E. Miller, 1989, Microeconomics, Prentice Hall, McGraw Hill

- Hal. R Varian , Intermediate Microeconomics, WW Norton and Company, 8th edition, 2010 (T)
- Ferguson, C. E. and Gould, J.P., Microeconomic Theory, Aitbs Publishers and Distributors,
- Lipsey, R. and Chrystal, A., 2007, Economics, OUP

## 4.1 An Introduction to Marketing and Pricing Strategy

### **Objective**

To learn the terminology, concepts, and tools that marketers use, and highlight the issues that managers (in marketing and across the other functional areas within the organization) encounter in creating, capturing, and sustaining value. To exposit the various sources of information available to managers to generate insight into customer preferences and remain apprised of the ever-changing marketplace. To provide students with an opportunity to evaluate marketing strategies and offer recommendations so as to enhance firm performance.

### **Module 1 (5 Hours)**

Course Overview - The Role of Marketing in Creating, Capturing and Sustaining Value - Identifying Marketplace Opportunities and Threats

### **Module 2 (10 Hours)**

Understanding a Firm's Strategic Orientation(s) - Gathering Information to Guide Marketing - Strategy - Measuring Market Demand - Analyzing Customer Behavior - Examining Diffusion of Innovation - Consumer Behavior Case

### **Module 3 (10 Hours)**

Segmenting the Marketplace - Selecting the Target Market - Positioning the Firm's 'Need-satisfying offering' - Designing Products and Services that Create Meaningful Customer Value - Developing the Augmented Product as a Means by which to transcend commoditization - Developing and managing brands (National Brands vs. Private-Labels)

### **Module 4 (15 Hours)**

Going to Market - Designing the Marketing Channel - Managing the Marketing Channel Shifting from cost to value-based pricing strategies Acquiring and Retaining Customers Assessing Customer Lifetime Value - Legal & Ethical Considerations in Marketing - Course review - Course wrap-up - Team presentation: "Our real-life observations and understanding of Marketing concepts"

**Recommended Reading:**

- Course Pack: Will contains required readings, lecture notes, cases and other relevant information pertaining to assignments
- Textbook:
  - Kotler & Armstrong, Principles of Marketing (Latest Edition), Pearson Education
  - Kotler, Keller, Koshy, Jha, Marketing Management – A South Asian Perspective (Latest Edition), Pearson Education.



## 4.2 Intermediate Macroeconomics

### Objectives

This course introduces the students to various models of output and employment, to enrich their understanding of the aggregate economy. The students will learn the theoretical basis of macroeconomic analysis and understand the link between theoretical models and policy problems. The students are also introduced to the economic growth and the micro-foundations of macroeconomics .

### Module 1 (4 Hrs)

Aggregate Demand : Components of Aggregate demand . Aggregate demand curve and its determinants . The policy of aggregate demand management. Consumption function Investment function , the Government and external sector role in determination of aggregate demand  
Aggregate Supply Meaning and derivation of aggregate supply curve. Its determinants and policy implications

### Module 2 (12 Hrs)

Macroeconomic Issues and interaction of aggregate demand and supply, including the IS-LM approach - The macroeconomic equilibrium --Inflation, Unemployment and Expectations Phillips curve; adaptive and rational expectations; policy ineffectiveness debate.

### Module 3 (14 Hrs)

Open Economy Models: Mundell-Fleming model; exchange rate determination; purchasing power parity; asset market approach; Dornbusch's overshooting model; monetary approach to balance of payments; international financial markets.

### Module 4 (10 Hrs)

Micro Foundations of Macroeconomics,. Micro Foundations of Consumption: Fisher's theory of optimal intertemporal choice; life-cycle and permanent income hypotheses; rational expectations and random-walk of consumption expenditure. Post Keynesianism  
Micro Foundations of Investment: determinants of business fixed investment; residential investment and inventory investment.

### Recommended Reading:

- Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
- N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010.
- Errol D'Souza, Macroeconomics, Pearson Education, 2009

- Paul R. Krugman, Maurice Obstfeld and Marc Melitz, International Economics, Pearson Education Asia, 9th edition, 2012.

### **4.3 Econometrics with R and Python**

#### **Objective**

To acquaint the students with basic tools and techniques to do econometrics using R and Python - to familiarize students with coding and syntax requirements in R and Python - to equip students with a working knowledge of statistical theory and their application to datasets in R and Python

#### **Module 1 (10 Hours)**

Basic data structures in R: Vectors, DataFrames, Lists, Matrix. Importing data from flat files, sql servers and web Data Manipulation using Dplyr: Filtering, Sorting, Selecting, Group By operations, Working with dates, joining dataframes, handling missing values Data Visualization: ggplot2, grammar of graphics, building custom plots using ggplot 2

#### **Module 2 (10 Hours)**

Basic Python Data structures: Numbers, strings, lists, dictionary, tuples, files. Importing data from flat files, sql servers and web Intro to Pandas Data Manipulation: Filtering, Sorting, Selecting, Group By operations, Working with dates, joining data frames, handling missing values Data Visualization: Using inbuilt pandas plotting functions. Using Seaborn and Plotly

#### **Module 3 (10 Hours)**

Feature Engineering - Doing sanity checks, imputing missing values, dealing with outliers, binning continuous variables Linear Regression in Python and R: Linear Regression: Predicting continuous variable using OLS, WLS, assumptions of Linear Model, constructing a regression model in Python, checking model assumptions, doing k-fold cross validation Logistic Regression in Python and R: Logistic Regression: Predicting a binary variable, interpreting model output, using Python to create a logistic model, checking model diagnostics, computing accuracy metrics, ROC, AUC, kappa, doing kfold cross validation

#### **Module 4 (10 Hours)**

Case Studies: Predicting customers who are likely to default on a loan payment based on historical data such NPA Status, Debt Ratio and more. Predicting the presence of a Heart Disease in an individual based on various attributes such as Cholestral levels, heart rate, blood pressure, Chest pain type, blood sugar and more.

#### **Recommended Reading**

Principles of Econometrics, Neeraj Hatekar, Sage Publications

## **4.4 Indian Economy 1947-1991**

### **Objective**

The key objective of the course is to analyse the performance of the Indian economy during the first four decades since independence. This course will familiarise the students how planning laid the foundation of long term growth process in the India.

### **Module 1 (10 Hrs)**

Pros and cons of colonial rule and the status of Indian economy on the eve of Independence. The Soviet model of planning in India- Historical roots, evolution of plan models, limitation and lessons- Dominance of Public Sector and License Raj. Industrial Stagnation- underlying factors and re-emergence- Green revolution in Agriculture and related issues.

### **Module 2 (10 Hrs)**

Indian Economy in the 1980s-Nationalization of Banks- Industrial revival in the 1980s- Initial round of reforms in the 1980s- Growth revival in the late 1980s.

### **Module 3 (10 Hrs)**

Importance of agriculture in national economy; Productivity in agriculture; Land reforms; New technology in Indian agriculture- Green Revolution- Need for second Green Revolution; Modern farm inputs and marketing- price policy and subsidies; Commercialisation and diversification

### **Module 4 (10 Hrs)**

Poverty in India- Magnitude and determinants; Concepts of Poverty and Poverty Line- Trends and Pattern of Urban and Rural Poverty- Committees on poverty estimation; Poverty eradication programmes- Pattern of income distribution and the question of inequality in India.

### **Recommended Reading:**

- Ahluwalia Isher Judge (1985): 'Industrial Growth in India: Stagnation Since the Mid-Sixties'. Oxford University Press, New Delhi.
- Balakrishnan, P. (2010): 'Economic Growth in India: History and Prospect'. Oxford University Press, New Delhi.
- Byres T.J (1998): 'The Indian Economy: Major Debates since Independence'. Oxford University Press, New Delhi.
- Chakraborty Sukhamoy (1987): 'Development Planning: The Indian Experience'. Oxford University Press, New Delhi.

- Kapila, Uma (2016): ‘Indian Economy since Independence: A Comprehensive and Critical Analysis of India’s Economy 1947-2016’, Academic Foundation, New Delhi.
- Nayyar Deepak (1994): ‘Industrial Growth and Stagnation: The Debate in India’, Oxford University Press, New Delhi.
- Roy Tirthankar (2000): ‘The Economic History of India 1857-1947’, Oxford University Press, New Delhi.
- Rudra Ashok (1975): ‘Indian Plan Models’. Allied Publishes, New Delhi.

## Articles

1. Bhagwati, J. and S. Chakravarty (1969), ‘Contributions to Indian Economic Analysis: A survey’, *American Economic Review* 59, *Supplement*.
2. Chakravarty, S. (1991), ‘Development Planning: A Reappraisal’, *Cambridge Journal of Economics*, 15, pp. 5-20
3. Government of India, Economic Survey (Annual Issues), Ministry of Finance, New Delhi.
4. Kohil , A. (2006): Politics of Economic Growth in India, 1980-2005, Part I: the 1980s, *Economic and Political Weekly*, April 1, 2006.
5. Mehrotra, Santosh and Jajati Parida (2017), “Why is the Labour Force Participation of Women Declining in India?”, *World Development*, Vol. 98, pp. 360–380.
6. Nagarj R (2003): Industrial Policy and Performance since 1980: Which Way Now? *Economic and Political Weekly*, August 30, 2003.
7. Raj. K. N. (1984): ‘Some Observations on Economic Growth in India over the Period 1952-53 to 1982-83’, *Economics and Political Weekly*, Vol. 19, Issue No. 41.
8. Ranjit Sau (1988): ‘The Green Revolution and Industrial Growth in India: A Tale of Two Paradoxes and a Half’. *Economic and Political Weekly*, April 16, 1988.
9. Rajiv Kumar and Vijay Kelkar (1990): ‘Industrial Growth in the Eighties- Emerging Policy Issues’, *Economic and Political Weekly*, Vol. 25, Issue No. 4.
10. Bhalotra Sonia (1998): ‘The Puzzle of Jobless Growth in Indian Manufacturing’. *Oxford Bulletin of Economics and Statistics*, Vol. 60 No 1.

## 4.5 Development Economics

### Objective

The course aims to equip students with the ability to analyze factors affecting long run economic growth, both from a positive and negative sense. Measures of long run development, and policies that help and hinder it are also covered in this course.

### Module 1 (10 Hrs)

Development and Underdevelopment: An Overview Background and beginning of 'Development Economics' in the post-world war era, its elements Defining economic development - Alternative measures of development –PQLI, HDI and its extensions, Development and growth- income as a measure of growth - Human development-Sens capability approach, development as freedom, Structural features of underdeveloped economies- International variations – development gap Underdevelopment as a low level equilibrium in a multiple equilibrium situation – low level equilibrium trap

### Module 2 (12 Hrs)

Perceptions about Development and Underdevelopment Vicious circle of poverty; big push, balanced and unbalanced growth, Dual economy models- Lewis model and its extensions, Harris- Todaro migration model - Poverty and Inequality: Definitions, Measures and Mechanisms - Concept of poverty and its measures - Inequality meaning – axioms - commonly used inequality measures, Kuznets curve - Impact of poverty and inequality on process of development (2)

### Module 3 (8 hrs)

Models of Growth and Theories of Development:

Causes of growth: Harrod - Domar model, Solow model and its variants, Contribution and application of New Growth Theory - O Ring Theory - Endogenized Solow Model

### Module 4 (10 Hrs)

Cross Country Differences in Development Paths and New Development Challenges Asia with special reference to China and India, Africa, Latin America Millennium Development Goals Sustainable Development Goals

### Recommended Reading:

- Kaushik Basu :Analytical Development Economics , OUP
- Debraj Ray : Development Economics

- Meier and Rauch,: Leading Issues in Economic Development, OUP, Latest Edition
- Human Development Reports, various years
- Thirlwall A. P. Growth and Development ( 6<sup>th</sup> and 7<sup>th</sup> edition)
- Bagchi A. K. The Political Economy of Underdevelopment, Cambridge University Press 1982.

## 4.6 Research Methodology

### Objective

The course aims to introduce undergraduate students to the importance of research methodology and its basic tools. They should be equipped with the ability to understand, and participate in the process of economic research, from problem formulation, sampling, and selection of appropriate tools for analysis.

### Module 1 (10 Hrs)

An introduction to Research methodology : Formulating the Research problems and questions which emerge with the help of examples; Critical Review of Literature on the Research to be conducted : Gaps observed in the past research; Research Design : Qualitative, Quantitative, Macro Study, Case Study, Ethnographic Study; Empirical Research, etc.

### Module 2 (10 Hrs)

Data Collection : Sources of Secondary Data, Steps involved in collection of Primary Data - Sampling design, Questionnaire, Interview Method, Observation Method, Focus Group Discussion, etc. Pilot Survey and Modification of Questionnaire if necessary; Data Entry and Cleaning; Coding, Tabulation – preparation of file templates containing variables;

### Module 3 (10 Hrs)

Analysis of Data through appropriate Statistical tools and Softwares; Interpretation of results and systematic presentation while preparing research report; Presentation of Qualitative data;

### Module 4 (10 Hrs)

Major Conclusions and Policy issues to be addressed to relevant stakeholders;  
Preparation of Bibliography and Annexures - Plagiarism detection methods - Referencing methods

#### Recommended Reading:

- Kothari CR (2013). *Research Methodology –Methods and Techniques*, New Age International (P) Limited, Publishers, New Delhi
- Uwe Flick (2009). *An Introduction to Qualitative Research*, 4<sup>th</sup> Edition, Sage Publications Ltd. U.K.
- Walliman Nicholas (2011). *Research Methods, the basics*, Routledge (Taylor and Francis Group)



## 5.1 Advanced Analytics Using R and Python

### Objectives

To equip students with the latest tools and techniques used in the fields of machine learning, deep learning and artificial intelligence. To acquaint them with the algorithms used in 1,2 and multi-layered neural networks, with or without convolutions.

### Module 1 (10 Hours)

Regularization, Grid Search, Cross validation, Regression validation and Classifier Validation Measures Clustering: kmeans clustering algorithm, running a kmeans model in R, deciding optimal number of clusters, profiling clusters, Hierarchical Clustering, single linkage, complete linkage, centroid method Decision Trees: Classification Trees, understanding purity metrics, gini, entropy, information gain, creating a classification tree, computing accuracy metrics: ROC, AUC

### Module 2 (10 Hours)

Random Forests, Bagging, Boosting, variable importance plots, parameter tuning using oob error, partial dependence plots  
OpenCV, read, manipulate and export images, capture video feeds, extract video frames  
Neural Network: Neurons, Activation functions, MLP Architecture, Loss Function, Network Training, Regularisation, Hyperparameter Tuning with example.

### Module 3 (10 Hours)

CNN: CNN Architecture, Convolutional Layer, Pooling Layer, Full Connection, CNN Training, Loss Function, Hyperparameter tuning with example

### Module 4 (10 Hours)

count vectoriser, tfidf, cosine similarity, supervised learning with text WOE, Information Value , PCA and SVD tokenization, pos tagging, ner tagging, traversing grammatical trees, sentiment analysis MLP, activation functions, cost functions, backprop

## **5.2 International Trade: Pure Theory**

### **Objective**

The course provides a fundamental understanding about the major principles and theories, which tend to govern the flow of trade in goods, services and capital at the global level. This course will lay down foundation for the advance courses taught at master's level at various universities.

### **Module 1 (12 Hrs)**

Mercantilist doctrine of balance of trade - Adam Smith and absolute advantage theory of trade - Ricardo and comparative advantage, its limitations - production possibility curve - Community indifference curve - Gain from trade - Offer curve - Determination of international equilibrium price -

### **Module 2 (10 Hrs)**

Different concepts of terms of trade - Factors affecting terms of trade. Heckscher Ohlin Model - Stolper-Samuelson Theorem – Rybczynski Theorem - definitions of factor abundance - relationship between factor prices and commodity prices - Factor price equalisation theorem - Factor intensity reversal - the Leontief Paradox.

### **Module 3 (8 Hrs)**

Other alternative explanations of the basis of trade in terms of technological lead, domestic market size and product cycle approach – Linder's hypothesis – Intra-industry trade.

### **Module 4 (10 Hrs)**

The rationale of tariffs, quotas and subsidies – infant industry argument – tariffs and factor income distribution – – tariffs, terms of trade and domestic prices – the optimum tariff rate – tariffs, subsidies and distortions in commodity and factor markets – effective rate of protection. Welfare implications of tariffs – Non-tariff barriers. Effects of quotas and other quantitative restrictions – tariffs versus quotas.

### **Suggested Readings:**

1. International Economics by Dominic Salvatore
2. International Economics by Bo Södersten, Geoffrey Reed
3. The Pure theory of International Trade by Miltiades Chacoliades.

## **5.3 Urban Economics**

### **Objective**

Why do most people prefer to live in cities? What happens when they live in cities? What problem do they face in cities? Generally, development of cities occurs with development of industrial townships. However, urbanization becomes a problem, since there is a shortage of space, lack of amenities, and traffic congestion. This course will teach aspirants about urban economics, models of development and planning, urban growth, Land uses, Housing, Public urban transport, Slums, urban environment problems and so on.

### **Module 1 (10 Hours)**

Introduction to Urban Economics - Scope and Dimensions -The Nature and Function of Cities- Models of Urban Development and Planning- The Urban Economy and Development Strategy - The Economics of Urban Growth - Models of Urban Growth - The Frontiers of Urban Growth -The Economics of Intra-urban Location Decisions- Residential and industrial locations-Semi urban areas- special townships.

### **Module 2 (10 Hours)**

Land Use Planning- General Urban Land-Use Models- The Determinants of Specific Land Uses- Changes in Land Uses- Land Use Policy- Land Reservation- Public Amenities - Town Planning-Small Cities Concept- Size of Liveable Areas - Space Planning - Floor Space Index Concept

### **Module 3 (10 Hours)**

Resource problems in urbanization - transportation, waste management and water - traffic Congestion - Traffic management and Policies- Public transport Surveillances- Route Mapping- Signal system - The Urban Environment - Environmental Pollution- Types of pollution and Management- Types of wastes: degradable and non-degradable - Garbage, Plastic, Biomedical Waste Managements – Sustainable development Policies.

## **Module 4 (10 Hours)**

Urban local Government- Types local bodies and Governance- Cantonment Boards- Special Areas Improvement Trust: Functions, Problems and limitations- Slums Areas: Locations and Problems - slum development policy- Urban Poverty: Problems, Measures, and Policies- the Nature of Urban Poverty -The Causes of Poverty- Urban Crime and management-

### **Recommended Reading:**

- Hartwick, John M. (2015) Urban Economics, Routledge; 1<sup>st</sup> edition.
- O’Sullivan, Arthur (2012) Urban economics, 8<sup>th</sup> Ed., McGraw-Hill/Irwin
- Button, K. J. (1976) Urban Economics Theory and Policy, Palgrave Macmillan UK.
- Rakesh A Mohan (1978) Urban Economic and Planning Models Assessing the Potential for Cities in Developing Countries, OCP- 25, World Bank.
- Duranton, G. (2007). Urban Evolutions: The Fast, the Slow, and the Still. American Economic Review, 97 (1), 197-221. <http://dx.doi.org/10.1257/aer.97.1.197>.
- Henderson, J. V. (1974) The Sizes and Types of Cities, The American Economic Review, Vol. 64, No. 4 (Sep., 1974), pp. 640-656, URL: <https://www.jstor.org/stable/1813316> Accessed: 05-10-2018 12:02 UTC.
- Black, Duncan and Henderson, Vernon (1999), A Theory of Urban Growth, Journal of Political Economy, 1999, vol. 107, no. 2, The University of Chicago.

## **5.4 Indian Economy Post 1991**

### **Objective**

The broad objective of the course is to familiarise the students about the macroeconomic reforms undertaken in the Indian economy since 1991 and the challenges the economy is facing currently.

### **Module 1 (10 Hrs)**

Economic Crisis of early 1990s-Macro Economic Reforms since 1991-Structural Adjustment Programmes- Globalisation, Liberalisation and Privatisation- impact of 25 years of reforms on various sectors of the economy- Planning to markets - NITI Ayog and discontinuation of Central Planning- Demonetisation and its macro-economic impact - growth and inequality from regional perspective in India. Agriculture during the Reform Period- New Agricultural Policy- WTO and Indian Agriculture- Current Issues in Indian agriculture. Investments and subsidies in Indian agriculture- Agrarian distress and related issues.

### **Module 2 (10 Hrs)**

New Industrial Policy 1991- Public Enterprises; Micro, Small and Medium Scale Industries (MSMEs)- Role, problems and remedies- Role of FDI in industrialization process- ICT based industrial development strategy- Make in India.

### **Module 3 (10 Hrs)**

Service sector as the engine of growth in India- Trade in services- Global technological change and Indian IT boom. Challenges of India's Service sector -External Sector- Foreign Trade- Salient features, composition and direction; Trade reforms- Balance of Payment; Exchange rate- India and WTO- Money and Banking- Organisation of India's money market and capital market- Changing role of Reserve Bank of India, Commercial banks, Development finance institutions, foreign banks and Non-banking financial institutions.

### **Module 4 (10 Hrs)**

Issues in Indian Public Finance- Fiscal reforms in India post 1991- Tax reforms and reforms in public expenditure management- Goods and Services Tax - Public Debt and Sustainability issues- Implementation of FRBM Act - Fiscal and Monetary Policy dynamics in India- Centre State Fiscal relationship- cooperative and competitive federalism in India- Role of Finance Commission- Local Bodies in India.

## Recommended Reading:

- Babu, Suresh M. (2018): 'Hastening Slowly: India's Industrial Growth in the Era of Economic Reforms'. Orient Black Swan, Hyderabad.
- Balakrishnan, P. (2010): 'Economic Growth in India: History and Prospect'. Oxford University Press, New Delhi.
- Balakrishnan, P. (ed) (2011): 'Economic Reforms and Growth in India'. Orient Black Swan, Hyderabad.
- Bhagwati Jagdish and Arvind Panagariya( 2012): ' India's Tryst with Destiny'. Collins Business, Noida, India.
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- Rakesh Mohan (ed) (2017): ' India Transformed- 25 years of Economic Reforms'. Penguin Random House, New Delhi.
- Vijay Joshi (2016): 'India's Long Road: The Search for Prosperity'. Penguin Random House, New Delhi.

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5. Chakraborty Pinaki (2016): 'Emerging Issues in Union-State Relations' *Economic and Political Weekly*, Vol 52, No. 9, March 2017.
6. Chakraborty Pinaki (2016): Restructuring of Central Grants: Balancing Fiscal Autonomy and Fiscal Space, *Economic and Political Weekly*, Vol. 51, No. 6, February 2016.
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16. Radhakrishna R.(2015): Well-being, Inequality, Poverty and Pathways Out of Poverty in India. *Economic and Political Weekly*, October 10.
17. Shankar Acharya (2005): 'Thirty years of Tax Reforms in India' *Economic and Political Weekly* May 14, 2005.
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19. Thomas Piketty and Nancy Qian (2009): 'Income Inequality and Progressive Income Taxation in China and India, 1986–2015'. *American Economic Journal: Applied Economics*, Vol. 1, No. 2, pp. 53-63.
20. Vijay Baskar (2018): Challenges before the XV<sup>th</sup> Finance Commission, *Economic and Political Weekly*, Vol Vol. 53, Issue No. 10.

## **5.5 Money Banking & Financial Markets**

### **Objectives**

This course introduces the students to the basic concepts of monetary economics and finance. It includes the structure and functioning of the banking and financial institutions and markets as well as the role of banking sector and money and financial markets in economic growth. and the working of the central bank. The course is expected to provide a thorough understanding of the building blocks of the contemporary monetary policy in India.

### **Module 1 (8 Hrs)**

Money-Concept, functions, measurement, introduction to modern currency systems

### **Module 2 (10 Hrs)**

Banking System—Bank balance sheets—Banks as depository institutions and their role in the money and credit supply—Indian banking sector composition, types of banks and contemporary issues of profitability and non- performing assets

### **Module 3 (10 Hrs)**

Role of Central Banking and Monetary Policy Functions, goals, targets, indicators and instruments of monetary control; monetary management in an open economy; current monetary policy of India

### **Module 4 (12 Hrs)**

Financial Institutions, Markets, Instruments - Structure and functioning of money and financial markets , Role of financial markets and institutions in the economic growth - Money and capital - instruments

### **Recommended Reading:**

- F. S. Mishkin and S. G. Eakins, Financial Markets and Institutions, Pearson Education, 6th edition, 2009.
- Frederic S. Mishkin, Economics of Money, Banking and Financial Markets, The, 11th Edition, 2009, Pearson
- F. J. Fabozzi, F. Modigliani, F. J. Jones, M. G. Ferri, Foundations of Financial Markets and Institutions, Pearson Education, 3rd edition, 2009.



- L. M. Bhole and J. Mahukud, Financial Institutions and Markets, Tata McGraw Hill, 5th
- edition, 2011.
- R.B.I. Bulletins, Annual Reports, Reports on Currency and Finance

## **6.1 Strategy and Game Theory**

### **Objective**

The course seeks to reinforce basic concepts in microeconomics and apply them to the world of business, strategy and decision making. The course is applied in nature, and bases itself extensively on case studies, real world problems and project work from both the corporate world as well as academia

### **Module 1 (10 Hrs)**

An overview of microeconomic models relevant to game theory - an introduction to the motivation for game theory - revisiting the prisoner's dilemma - the 2x2 form standard model - dominance - Nash equilibrium - SPNE

### **Module 2 (10 Hrs)**

Zero sum games - general sum games - the coordination problem - cooperative games - non-cooperative games - decision making and uncertainty - reciprocal decision making - case studies

### **Module 3 (10 Hrs)**

Voting theory - voting strategies - auctions - types of auctions - auction design - elicitation - scoring rules - adaptive decision making

### **Module 4 (10 Hrs)**

Case studies: pricing, marketing, strategy, HR, finance, taxation, dominant assurance contracts, compliance, incentive design

### **Recommended Reading:**

- The Art of Strategy, by Avinash Dixit and Barry J. Nalebuff
- Games of Strategy, by Avinash Dixit
- Game Theory 101: The Complete Textbook by William Spaniel
- Introducing Game Theory: A Graphic Guide by Ivan Pastine, Tuvana Pastine and Tom Humberstone

## **6.2 Behavioral Economics**

### **Objective**

To explain economic decision-making process and role of psychology in it and to elaborate the deviation in reality and standard economic theoretical predictions in the framework of behavioral economics

### **Module 1 (10 Hours)**

Introduction to Behavioral Economics Origins of Behavioral Economics, Decision-making under Neo-classical economic framework- rationality, optimization Role of Intuition, Emotions, Beliefs in decision making Bounded Rationality Judgment under Risk & Uncertainty : Heuristics & Biases Heuristics : Representativeness, Substitution, Availability, Affect, Anchoring, framing Biases: Cognitive and emotional biases

### **Module 2 (10 Hours)**

Choice Under Risk & Uncertainty Expected Utility Prospect Theory – Reference Points – Risk Concept and Understanding – Loss Aversion – Shape of Utility Function – Decision Weighting – Probabilistic Judgment. Mental Accounting Framing Mental Accounts Fungibility & Labels Hedonic Editing

### **Module 3 (10 Hours)**

Intertemporal Choice, Temporal Choice, Construal Level Theory, Valuation of Delayed Consumption Preferences for Sequences of Outcomes, Hyperbolic Discounting, Preference Reversal

### **Module 4 (10 Hours)**

Behavioral Game Theory Social preferences: Fairness, trust, cooperation, reciprocity, Norms Limited Strategic Thinking Choice architecture: Nudge, Nudge vs. boost, Behavioral public policy

### **Recommended Reading:**

- Erik Angner, “A Course in Behavioral Economics”, Palgrave Macmillan
- M. Altman, Handbook of Contemporary Behavioural Economics: Foundation and Developments (2007), Prentice Hall India
- E. Cartwright, Behavioural Economics (2011), Routledge
- D. Kahneman, Thinking Fast and Slow (2011), Allen Lane, Penguin Books
- G. Loewenstein, Exotic Preferences: Behavioural Economics and Human Motivation (2007), Oxford University Press
- Sanjit Dhami, "The Foundations of Behavioral Economic Analysis", Oxford University Press (2016)
- Behavioral Economics: Toward a New Economics by Integration with Traditional Economics by Ogaki, Masao, Tanaka, Saori C. Published by Springer, ISBN 978-981-10-6439-5
- Nick Wilkinson; Matthias Klaes(2012), An Introduction to Behavioral Economics, 2nd Edition, Palgrave Macmillan.
- World Development Report 2015: Mind, Society, and Behavior

## 6.3 History of Economic Thought

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### Objective

To familiarize students with i) developments in major field of economics, ii) schools of thought in economics and iii) works of some great economist from antiquity to contemporary times.

### Module 1 (10 Hrs)

Mercantilism & Physiocrats - Limitations of national resources. Importance of Foreign Conquest, Colonization and Trade, Role of State in Foreign Trade, Definition of Wealth and the ways in which to augment it, Importance of the Balance of Trade, Works of Francis Bacon, Thomas Mum, Josiah Child, John Cary, Charles Davenant, John Stuart Mill  
Age of Enlightenment – France, Italy, Scotland. The Physiocratic school. Definition of surplus. The organization of economic activities and transactions. The Tableau Economique Works of Jacques Turgot, Francois Quesnay, Richard Cantillon.

### Module 2 (10 Hrs)

British Political Economy - Nature of the Surplus, Source of Value, Measure of Value, Market Prices and Natural Prices, Profits and Wages, Gross and Net Revenue (national income), Income Distribution, Works of Adam Smith, David Ricardo, Robert Malthus, Objections raised by J. B. Say, Charles Dupuit, W Stanley Jevons, and Leon Walras, J.M. Keynes

### Module 3 (10 Hrs)

Socialism - Rise of Socialist ideas, Political background, Ricardian Theory of Rent, Nationalization of Land, French Socialists, Marxism, Marx's writings in theoretical economics. The Marxian twist, Marxism post – 1991 - Schumpeter's Critique

### Module 4 (10 Hrs)

Indian Economic Thought - Early Indian economic thought - Chanakya's Arthashastra - Colonial Economic policies, Unfair treatment of the colonies, Nationalist response, Swadeshi Movement. Economic ideas of M. G. Ranade, Dadabhay Nowrosjee, Gopal Krishna Gokhale, Dr. B. R. Ambedkar, M.K. Gandhi

### Recommended Reading:

- History of Economic Analysis by Joseph Schumpeter
- Handbook on the History of Economic Analysis (eds) G. Faccarello and Heinz D. Kurz.

## **6.4 Environmental Economics**

### **Objective**

This course is designed to cover the most critical topics in environmental economics today. Through this course, students will gain solid understanding of environmental issues and the economic incentive instruments that can be employed to protect, improve and conserve the environment.

### **Module 1 (10 Hrs)**

Meaning-Nature-Scope-Significance of environmental economics, Economy and environment interlinkages, Eco-systems, Common property resources, Environment and development trade-off, Sustainable development.

### **Module 2 (10 Hrs)**

Environmental problems of industrial development: Water pollution, Air pollution, Noise pollution, Thermal pollution, Marine pollution, Nuclear pollution.  
Global environmental issues: Ozone depletion, Global warming, Climate change, Acid rain, Loss of Biodiversity, Endangered species, Trade of hazardous material.

### **Module 3 (10 Hrs)**

Technological changes in Agriculture and Environment: Excess use of Water, Fertilizers, Pesticides, Over extraction of groundwater, Concept of Natural Farming.  
Forest Depletion: Causes, consequences and remedies, Significance of social forestry.

### **Module 4 (10 Hrs)**

Role of public and private sector in environmental protection – Rain water harvesting, Solid waste management, etc., Environmental regulation in India: Air and water acts, Fiscal incentives, Enforcement and Implementation issues, Emerging options – eco-taxes and eco-subsidies, Case studies on pollution control in India.

### **Recommended Reading:**

- Singh & Shishodia (2010), Environmental Economics: Theory and Applications, Sage Publications, New Delhi.

- R. N. Bhattacharya (2006), Environmental Economics: An Indian Perspective, Oxford University Press, New Delhi.
- Muthukrishnan Subhashini (2015), Economics of Environment, Prentice Hall India Pvt Ltd.
- Shogren, J Hanley, N and White, B. (2013) Introduction to Environmental Economics, 2<sup>nd</sup> edition, Oxford: Oxford University Press.
- Ulaganathan, Sankar (2006), Environmental Economics, Oxford University Press, New Delhi.
- Hanley, Shogren and White (2004), Environmental Economics in Theory and Practice, McMillan India Limited, Delhi.
- The Hindu Survey of Environment: Annual Reports.
- Kolstad, C, Environmental Economics, Oxford University Press.
- Bhardwaj, R. ,Managing Limits to Growth, Asian and Pacific Development Centre, Kula Lumpur.
- Dorfman, R. & N. Dorfman (Eds.) ,Economics of the Environment, W. W. Norton, New York.
- Charles Peering , Economy and Environment Cambridge University Press, New York.
- Ali, S. A. , Resources for Future Economic Growth, Vikas Publishing House, New Delhi.
- Singh, G. N. (Ed.) , Environmental Economics, Mittal Publications, New Delhi.
- Baumol, W.J, and W.E. Oates, The Theory of Environmental Policy, Cambridge University Press.
- Tietenberg, T. Environmental Economics and Policy, Harper Collins, New York.

## **6.5 Energy Economics**

### **Objective**

To acquaint students with theoretical and empirical topics from the field of energy and related areas, specifically pertaining to demand, supply, prices, environmental consequences and associated regulatory issues.

### **Module 1 (10 Hours)**

Introduction and Background - Review of the Basics of Supply, Demand and Price Formation in Competitive Markets - Energy Supply and the Economics of Depletable Resources - World Oil Markets and Energy Security

### **Module 2 (10 Hours)**

Natural Gas Price Regulation, Deregulation and Markets - Evolution of the Electricity Market in India - Electricity Act (2003) - techniques specific to energy and electricity markets in India: Risk Management, Futures Markets and Derivatives

### **Module 3 (10 Hours)**

Coal - Nuclear Power - Energy Efficiency Policies - Renewable Energy Policies - comparative analysis of these markets from an India vs rest of the world perspective - The role of IREDA

### **Module 4 (10 Hours)**

Energy and Climate Change - Pigouvian pricing - externalities - pricing externalities - Internalizing Environmental Externalities with a Focus on CO<sub>2</sub> Emissions Cap and Trade Mechanisms

### **Recommended Reading:**

- Energy Economics (Routledge Textbooks in Environmental and Agricultural Economics) Hardcover by Peter M. Schwarz
- Energy Economics (Springer) by Peter Zweifel