## Four Year Undergraduate Programme (FYUP) (Under NEP- 2020)

## **B.A.** (Hons./Hons. with Research) Economics

## Course Structure & Syllabus Semesters I, II, III & IV (w.e.f. 2024-25)



Department of Economics Faculty of Social Sciences Jamia Millia Islamia, New Delhi - 110025

Department of Economics B.A. (Hons./Hons. with Research) Economics (FYUP: Four Year Undergraduate Programme, w.e.f. 2024-25)										
Paper Code	Paper Title	Credits <sup>#</sup>	Internal Assessment Marks (25%)	Semester End Examination Marks (75%)	Total Marks					
Semester I (July- December)										
Major (Only for Department)										
24-ECO-C-100	Microeconomics-I	4	25	75	100					
24-ECO-C-101	Mathematical Methods for Economics-I	4	25	75	100					
Minor (Open to Other Department)										
24-ECO-M-102	Principles of Microeconomics	4	25	75	100					
Multidisciplinary (Open for All)										
24-ECO-T-103	Economics of Education	3	19	56	75					
Abilit	ty Enhancement Course (Open for	All and Off	fered by Departme	ent of English)						
24-ENG-A-106	General English-I	2	13	37	50					
	Skill Enhancement	Course (O	pen for All)	•						
24-ECO-S-104	Data Visualization for Economics*	3	19	56	75					
	Value Added Co	ourse (Open	for All)	•						
24-ECO-V-105	Introduction to Environmental Thought	2	13	37	50					
Compulsory (Only Qualifying and Offered by Other Departments)										
Qualifying – I	General Urdu-I	2	13	37	50					
Qualifying – II	IRC/HRS/Islamiat**	2	13	37	50					
	Total Credits	22	Total M	larks	550					
	Semester II (	January	- June)							
	Major (Only	for Departi	nent)							
24-ECO-C-150	Microeconomics-II	4	25	75	100					
24-ECO-C-151	Mathematical Methods for Economics-II	4	25	75	100					
Minor (Open to Other Department)										
24-ECO-M-152	Principles of Macroeconomics	4	25	75	100					
	Multidisciplin	ary (Open f	or All)							
24-ECO-T-153	Financial Economics	3	19	56	75					
Abilit	ty Enhancement Course (Open for	All and Off	fered by Departme	ent of English)	•					
24-ENG-A-156	General English-II	2	13	37	50					
Skill Enhancement Course (Open for All)										
24-ECO-S-154	Introduction to Indian Statistical System	3	19	56	75					
Value Added Course (Open for All)										
24-ECO-V-155	Introduction to Environmental Studies	2	13	37	50					
Compulsory (Only Qualifying and Offered by Other Departments)										
Qualifying – I	General Urdu-II	2	13	37	50					
Qualifying – II	IRC/HRS/Islamiat**	2	13	37	50					
24-ECO-I-157	Inte	ernship 4 Cred	lits							
Total Credits     22+4     Total Marks					550					

\*This course will have Practical/Lab. based assessment instead of internal assessment.

\*\* Qualifying - II shall be any one of Islamiat/Hindu Religious Studies (HRS)/Indian Religions and Culture (IRC). #Weekly One period/hour class per credit.

Department of Economics B.A. (Hons./Hons. with Research) Economics (FYUP: Four Year Undergraduate Programme, w.e.f. 2024-25)									
Paper Code	Paper Title	Credits <sup>#</sup>	Internal Assessment Marks (25%)	Semester End Examination Marks (75%)	Total Marks				
Semester III (July-December)									
Major (Only for Department)									
24-ECO-C-200	Macroeconomics-I	4	25	75	100				
24-ECO-C-201	Statistical Methods-I	4	25	75	100				
Minor (Open to Other Department)									
24-ECO-M-202	Foundations of Mathematics for Economics	4	25	75	100				
Multidisciplinary (Open for All)									
24-ECO-T-203	National Income Accounting	3	19	56	75				
	Ability Enhanceme	nt Course (O	pen for All)	<u> </u>					
24-ECO-A-204	Labour Economics	2	13	37	50				
	Value Added C	ourse (Open	for All)						
24-ECO-V-205	Environmental Economics	2	13	37	50				
Compulsory (Only Qualifying and Offered by Other Departments)									
Qualifying – I	General Urdu	2	13	37	50				
Qualifying – II	IRC/HRS/Islamiat*	2	13	37	50				
Total Credits19Total Marks									
	Semester I	V (Janua	ry- June)						
Major (Only for Department)									
24-ECO-C-250	Macroeconomics-II	4	25	75	100				
24-ECO-C-251	Statistical Methods-II	4	25	75	100				
24-ECO-C-252	Indian Economy	4	25	75	100				
	Minor (Open to Other	r Department	t)						
24-ECO-M-253	Statistical Methods for Economics	4	25	75	100				
Ability Enhancement Course (Open for All)									
24-ECO-A-254	Health Economics	2	13	37	50				
	Value Added Course (Open for All)								
24-ECO-V-255	Energy Economics	2	13	37	50				
Compulsory (Only Qualifying and Offered by Other Departments)									
Qualifying – I	General Urdu	2	13	37	50				
Qualifying – II	IRC/HRS/Islamiat*	2	13	37	50				
24-ECO-1-258 Vocational Course/Summer Internship 4 Credits									
	20+4	Total	Marks	500					

\* Qualifying - II shall be any one of Islamiat/Hindu Religious Studies (HRS)/Indian Religions and Culture (IRC). #Weekly One period/hour class per credit.

# Semester- I

## **B.A.** (Hons./Hons. with Research) Economics

## **Course: Microeconomics- I**

Type of Course: Major

**Code:** 24-ECO-C-100

Semester: I

Credits: 4

## I. Introduction to the Course

The course is designed for the students at entry level in undergraduate programme and to expose students to the basic principles of microeconomic theory. The emphasis will be on teaching the fundamental economic concepts and theories pertaining to the important economic players – the consumer and the producer. This course may use graphical/diagrammatical and mathematical methods to illustrate how microeconomic concepts can be understood with lucidity and the students may be exposed to apply the learnings to analyze real-life situations.

## **II.** Course Objectives

- To understand the basic concepts of Economics
- To learn the trade-offs and allocation problems due to scarcity of resources, while optimising the economic decisions.
- To analyse the individual behaviour to make consumption and production decisions.
- To connect theories to real world situations.

## **III. Learning Outcomes**

- The students are expected to be equipped with a solid understanding of microeconomic theory and its practical applications.
- To understand the behaviour of consumers and producers in relation to consumption and production.
- Preparing the students for further study in economics and related fields.

## **IV. Course Contents**

## **Unit-1: Basic Economic Concepts**

- Introduction to Economics and Economic Problems
- o Economic Trade offs, Opportunity Costs, and Resource Allocation,
- o Assumptions of Rationality, Consistency and Transitivity
- o Law of Demand/Supply, Determinants of Demand/Supply,
- Individual Demand/Supply, Market Demand/ Supply Curve
- Concept of Equilibrium Static and Dynamic
- o Elasticity of Demand/Supply and Its Measurement,
- Consumer/Producer Surplus.

## **Unit-2: Theory of Consumer Behaviour**

- Consumer Preferences, Utility and Choice
- Consumer's Equilibrium Cardinal Utility Approach, Ordinal Utility Approach, Revealed Preference Approach

- Derivation of Demand Curves Marshallian Approach, IC Approach and Revealed Preference Approach
- o Price Consumption Curve, Income Consumption Curve, Engel Curve
- o Income Effect, Substitution Effect and Price Effect (Hicks and Slutsky Approaches)

## **Unit-3: Theory of Production and Costs**

- Production Functions Linear, Quasi-linear, Cobb-Douglas, CES
- o Law of Variable Proportions, Returns to Scale, Elasticity of Substitution
- Isoquants, Iso-Cost Lines, Producer's Equilibrium
- $\circ$   $\,$  Traditional Theory of Costs Short run and Long run Cost Curves
- Modern Theory of Cost Short run and Long run Cost Curves,
- Engineering Cost Curves Short run and Long run Cost Curves,
- Cost Curves and Their Relationships, Economies of Scale and Relevance of Shapes of Cost Curves in Decision Making.

- 1. Varian H.R: Intermediate Microeconomics, 7th Edition 3 2.
- 2. Pindyck, Rubinfield and Mehta: Microeconomics, 6th Edition
- 3. Ferguson and Gould: Microeconomics, 6th Edition
- 4. Gravelle and Rees: Microeconomics; Pearson Education, 2nd Edition
- 5. Nicholson, Microeconomics
- 6. Koutsoyiannis, A.: Modern Microeconomics

## **Course: Mathematical Methods for Economics-I**

## **Type of Course:** Major **Semester:** I

Code: 24-ECO-C-101 Credits: 4

## I. Introduction to the Course

For the strong foundation of economic modeling at under graduate level, basic knowledge of Mathematics is essential. Therefore, this course provides an extensive and thorough use of mathematical concepts. In this direction students are expected to gain the knowledge of the concepts of set theory, functions and graphs, limits, continuity and single variable differential calculus, single variable optimization and integral calculus. This course has been designed keeping in mind the aforesaid need of the students. The main focus will be on understanding how the mathematical tools can be used to analyze the economic problems.

## **II.** Course Objectives

- To enhance the mathematical skills essential to study economics.
- To identify, solve and interpret the economic results mathematically.
- To understand and create economic models.
- To explore the techniques to solve complex problems of economics.

## III. Learning Outcomes

At the end of the course, students are expected,

- To advance the mathematical skills necessary to study Economics.
- To know the basic concept of mathematics used in Economics.
- To understand the analytical skills required for solving problems in economics.
- To apply the various tools of mathematics in Economics.
- To evaluate the economic policy quantitatively.

## **IV. Course Contents**

## Unit -1: Basic concepts, Functions and Graphs

- Sets and set operations, Ordered pairs, the real numbers, natural numbers, integers, rational and irrational numbers; absolute value and intervals; inequalities.
- The general concept of function, types of function (linear, quadratic, power, exponential, inverse); graphs of functions; Applications in Economics

## Unit-2: Limits, Continuity and Single variable Differential Calculus

- Limits, continuity and differentiability, rules of differentiation (simple differentiation, sums, products, and quotients)
- Second and higher order derivatives, power rule, chain rule, implicit differentiation; Linear approximation and differentials
- Quadratic approximations
- o Elasticities the Intermediate-value Theorem
- The Extreme-value Theorem
- The Mean-value Theorem
- Indeterminate forms and L'Hopital's rule
- Applications in Economics

## Unit-3: Single variable optimization and Integral Calculus

- Stationary points of a function, Maxima and Minima (local and global)
- o Convexity and Concavity of functions
- o Points of inflection; Optimization of economic functions
- Rules of integration, integration by parts, integration by substitution, indefinite integral, Definite Integral, Proper, and Improper integral
- $\circ$  Areas under curves and economic application of integration

- 1. Knut Sydsaeter and Peter J. Hammond (2005), *Mathematics for Economic Analysis*. Pearson Educational Asia: Delhi, 4th Indian reprint.
- 2. Chiang, A. C. & Kevin Wainwright (2005) (Fourth Edition): Fundamental Methods of Mathematical Economics, McGraw-Hill.
- 3. Allen, R.G.D.(1974), Mathematical Analysis for Economists, McMillan press, London
- 4. Chiang, A. C. (1984), Fundamental Methods of Mathematical Economics, 3rd Ed, McGraw-Hill.
- 5. Hoy, M., J. Livernois, C. McKenna, R. Rees and T. Stengos(2001), Mathematics for Economics, 2nd Edition Prentice Hall, India.
- 6. Dowling, Edward T. (1992), Schaum's Outline of Theory and Problems of Introduction to Mathematical Economics, 3rd Edition, McGraw Hill.
- 7. Rosser, Mike. (2003). Basic Mathematics for Economists, Second Edition, Routledge, Taylor & Francis Group
- 8. Handerson, Quandt. (1980). Microeconomic Theory, A Mathematical Approach, Third Edition, McGraw Hill.

## **Course: Principles of Microeconomics**

Type of Course: Minor

Semester: I

Code: 24-ECO-M-102 Credits: 4

## I. Introduction to the Course

This introductory microeconomics course is designed to offer the students with understanding fundamental principles which govern the behaviour of individual economic agents. Students will be able to understand how individuals make decision to maximise their objective subject to resource constraints. This course also offers the students the functioning of Markets. This course also sheds light on the role of price in allocation of resources.

## **II. Course Objectives**

- To provide students with a robust foundation in the fundamental principles of supply and demand, both at the individual and firm levels.
- This course also intends to build an understanding of how changing prices affect social welfare.
- Through theoretical exploration and applications, students will gain insight into behaviour of agents in the economy, enabling them to analyse and understand economic activities.

## **III. Learning Outcomes**

- Students will acquire necessary knowledge and skills for translating the preferences of economic agents into demand and supply curves.
- Students will also grasp the mechanism of attaining individual and market equilibriums and gain insight into the different market structures
- Skills learned during this course will equip students to effectively participate in other courses of economics.

## **IV.** Course Contents:

## **Unit- 1: Basic Concepts in Economics**

- Nature and scope of economics, opportunity cost, scarcity, production possibility frontier; Market as a system to allocate available resources in the economy, welfare state; Microeconomics-vs-macroeconomics.
- Demand function, demand curve and demand schedule; law of demand, determinants of individual demand; market versus individual demand schedule; extension and contraction of demand, shifts in the demand curve.
- Supply function, supply schedule and supply curve, determinants of supply; market versus individual supply; extension and contraction of supply, shifts in the supply curve.
- Consumer and producer surplus, concepts of elasticity of demand; factors affecting elasticity of demand; elasticity of supply, elasticity and revenue.

## **Unit- 2: Consumer and Producer Theory**

- **Consumer Theory:** Cardinal and ordinal measures of utility, utility function, total utility, marginal utility, law of diminishing marginal utility, water-diamond paradox, budget constraint, consumption and income/price changes, demand for all other goods and price changes; consumer's optimum choice.
- **Producer Theory:** Production function, total, marginal, and average products; law of variable proportion, production isoquants, return to scale using isoquants, economic region of production. Cost of Production: Long run and short run costs of production, various cost concepts and shape of their curves; short run costs and output decisions; equilibrium of the firm.

## Unit-3: Markets

- Perfect competition: Assumptions, equilibrium of the firm and the industry in the short and the long runs, including industry's long run supply curve.
- Monopoly: Significance and features of monopoly, price and output under monopoly.

- 1. Armstrong, W. E. (1950). A note on the theory of consumer's behaviour. *Oxford Economic Papers*, 2(1), 119-122.
- 2. Krugman, P. R., & Wells, R. (2009). *Economics*. Macmillan.
- 3. Mankiw, N. G. (2018). Principles of Microeconomics, Eighth Edition, Cengage Learning.
- 4. Pindyck, R. S., & Rubinfeld, D. L. (2008). *Microeconomics*, Eighth Edition. Pearson Education.
- 5. Browining, E.K. and Zupan, M.A. (2015) Microeconomic: Theory & Applications. Wiley
- 6. Case, K. Ray Fair, & Sharon Oster, (2017), *Principles of Microeconomics*, Global Edition. Pearson Education
- 7. Janssen, M., Knuuttila, T., & Morgan, M. S. (2024). Insider apology for microeconomic theorising?. *Journal of Economic Methodology*, 1-12.
- 8. Lipsey, R. and Chrystal, A. (2020). *Economics*, Fourteen Edition. Oxford University Press.
- 9. Salvatore, D. (2006). *Schaum's Outline of of Microeconomic Theory*, McGraw-Hill, Fourth Edition.
- 10. Goodwin, N., Harris, J. M., Nelson, J. A., Rajkarnikar, P. J., Roach, B., & Torras, M. (2022). *Microeconomics in context*. Routledge, Fifth Edition.

## **Course: Economics of Education**

**Type of Course:** Multidisciplinary Course

Code: 24-ECO-T-103 Credits: 3

## Semester: I

## I. Introduction to the Course

This introductory course introduces the basic concepts of the economics of education. The historical experiences show that education has played a central role in social and economic development of many countries. It is pertinent to expose students about the mechanisms through which education affects social and economic outcomes.

## **II.** Course Objectives

- To provide the theoretical tools and framework to understand impact of education and society and economy.
- This course intends to impart the knowledge and understanding of various sources of financing for different levels and nature of education
- The course exposes students to Indian education sector; its scope challenges.

## **III. Learning Outcomes**

- To be able to appreciate centrality of education in development process
- To able to conduct cost-benefit analysis for investment on education
- To be able to examine and analyse potential impacts policy changes on education sector

## **IV. Course Contents**

## **Unit- I: Economics of Education**

- Meaning and Scope of Economics of Education,
- o Centrality Education in Development
- Education & Human Resource Development
- Economic growth and development Linkages,
- Education as signaling device in labour market
- o Human Capital Index

## **Unit -2: Education Planning and Finance**

- Education planning techniques,
- Cost Benefit Analysis/rate return of expenditure on education- public vs private
- Education and earnings relationship
- o Theories of Public Expenditure, Resource Mobilisation and Utilisation,
- o Investment Trade-off between school vs higher education.
- Public Financing of Education in India
- International Perspective on Public Financing of Education

## **Unit -3: Education in India**

- Indian perspective to education, Sarva Shiksha Abhiyan
- Right to Education with special reference to Constitution of India.
- o National Education Policy 2020: scope and challenges
- $\circ~$  Higher Education in India: Issues and Concerns
  - Socio-economic inequality in access to higher education
  - Skill formation and productivity
  - Research & Development
  - Brain Drain etc.

- 1. Agarwal,A.K. (2005), *Development of Educational Systems in India*, Anmol Publicatons Pvt. Ltd.
- 2. Belfield, C.R. (2000), *Economic Principles for Education: Theory and Evidence*, Edward Elgar Publishing.
- 3. Blaugh, Mark (1972) An Introduction to the Economics of Education
- 4. Checchi, D. (2006), *The Economics of Education: Human Capital, Family Background and Inequality*, Cambridge University Press.
- 5. Deka, B. (2000), *Higher Education in India: Development and Problems*, Atlantic Publishers &Dist.
- 6. Government of India (2022), National Education Policy 2020, New Delhi.
- 7. Gupta, N.L. (2000), Human Values in Education, Concept Publishing Company.
- 8. Harris, I.M. and Morrison, M.L., Peace Education, McFarland, 2003.
- 9. *Higher Education in India: Issues, Concerns and New Directions* (December 2003). Recommendations of UGC golden jubilee Seminars-2003, held at eleven universities in India.
- 10. Jha, P., Das, S., Mohanty, S.S. and Jha, N.K. (2008), *Public Provisioning of Elementary Education in India*, Sage Publications India Pvt. Ltd.
- 11. Kashyap, S.C. (2006), The Constitution of India, Universal Law Publishing.
- 12. Kraay, A. (2018). Methodology for a World Bank Human Capital Index. *World Bank Policy Research Working Paper*, (8593).
- 13. Kumar, B. and Hansara, B.S. (2000), *Extension Education for Human Resource Development*, Concept Publishing Company, 2000.
- 14. Pathak, R.P. (2007), Education in the Emerging India, Atlantic Publishers & Dist.
- 15. Sharma, R.N. and Sharma, R.K. (2004), *Problems of Education in India*, Atlantic Publishers &Dist.
- 16. World Development Report 1980, World Bank Publications

## **Course: Data Visualization for Economics**

Type of Course: Skill Enhancement Course (SEC)

Code: 24-ECO-S-104

## Semester: I

Credits: 3

## I. Introduction to the Course

There is a huge opportunity to find and share the insights contained in data. This course helps in how to use Tableau Software to convert raw data into compelling data visualizations that provide insight or allow viewers to explore the data for themselves. The course will involve a healthy balance of classroom discussion and experiential activities, which will generally include a mixture of lectures and hands-on learning.

## **II. Course Objectives**

- Generate ways of communicating with data
- Build dashboards to combine several visualizations

## **III. Learning Outcomes**

At the end of this course, students will

- Students will understand the various ways in which different types of data can be visualized
- Students will make use of the capabilities of the tableau software to make charts that are able to convey the information in the right sense
- Students will examine the relationships that may exist between the various business variables to draw inferences about the business
- Students will create reports, dashboards etc. using tableau to communicate with the outside world

## **IV. Course Contents**

## **Unit-1: Dashboards, Charts and Tables**

- Introducing Dashboard, Principles of Communicating Data, Types of Dashboards, Introduction to Tableau and Excel
- Table Design, Sparklines, Chartless Visualization, Formatting and Customizing Charts, Charts for Trending Data, Group Data and Performance Data

## **Unit-2: Data Model and Pivot Tables**

 Developing Your Data Model, Adding Interactive, M Charged Reporting, Pivot Tables, Pivot Charts, A Interactivity with Slicers, Internal Data Model and Power View, Dashboard Sharing

## **Unit-3: Dashboards with Tableau**

 Discrete and Continuous Data, Ratios and Rates, Proportions and Percentages, Mean and Median, Variation and Uncertainty, Multiple Quantities, Changes Over Time, Maps and Location, Adding Interactivity to Dashboards

- 1. Communicating Data with Tableau, Ben Jones, O'reilly, 2014
- 2. Excel Dashboards and Reports, 2nd Edition, Michael Alexander, John Walkenbach, Wily, 2013
- 3. https://www.tableau.com
- 4. https://support.microsoft.com/en-us/excel

## **Course: Introduction to Environmental Thought**

Type of Course: Value Added Course (VAC)

**Code:** 24-ECO-V-105

## Semester: I

Credits: 2

## I. Introduction to the Course

Most people express concerns these days over deterioration of the natural environment, be it just around them (plastic waste), or the city they live in (air pollution) or even at the global level (ozone layer depletion). But expression of thoughts by many individuals for conservation of environment—for its social value—started many decades ago, across continents. Over time, the individual thoughts were shared by others—the common 'agenda' gave rise to environmentalism. The economic, social, political, religious (and other) positioning of different 'groups' resulted in varieties of environmentalism. Some of them could influence the framing of environmental policies in many countries, including India. Of course, some environmental policies have come about due to commitments made in international platforms. This course covers these elements, at an introductory level. No prior knowledge of any discipline is necessary.

## **II.** Course Objectives

- To *understand* the origin and evolution of environmental thought
- To *identify* and *contrast* the attributes of the varieties of environmentalism
- To *connect* environmentalism with environmental policies in India
- To analyse select environmental policies in India

## **III. Learning Outcomes**

At the end of the course, students are expected,

- To *identify* the changing contours of environmental thought over time and space
- To *distinguish* between different types of environmentalism
- To appraise the influence of environmentalism on policies and regulations in India
- To *recognize* the broad features of the policy framework related to environment in India

## **IV. Course Contents**

## Unit-1: Evolution of Environmental Thought and Environmentalism

- Introduction to environmental thought
- Origin of modern environmental thought
- Introduction to environmentalism and its varieties
- Contrasting environmentalism in the industrial/ developed with non-industrial/ developing countries (environmentalism of the poor)
- Environmentalism through international treaties

## **Unit-2: Environmentalism in India**

- Varieties of environmentalism in India
- o Contributions of judiciary in India on environmental matters
- o Indian environmental movements
- Impact of environmentalism on policies in India

## **Unit-3: Environmental Policies in India (selected)**

- Environment in the Indian Constitution (Fundamental Duties, other Articles and case law)
- National Forest Policy (1988)
- National Environmental Policy (2006)
- National Water Policy (2012)

- 1. David Pepper (1993) *Eco-Socialism: from Deep Ecology to Social Justice*, Routledge. (Selected chapters)
- 2. Joan Martinez-Alier (2003) *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, Edward Elgar. (Selected chapters)
- 3. Kanchan Chopra (2017) *Development and Environmental Policy in India: The Last Few Decades*, Springer. (Selected chapters)
- 4. Madhav Gadgil and Ramachandra Guha (1992) *This Fissured Land: An Ecological History of India*, Oxford University Press, New Delhi. (Selected chapters)
- 5. Madhav Gadgil and Ramachandra Guha (1995) *Ecology and Equity: The Uses and Abuses of Nature in Contemporary India*, UNRISD and OUP. (Selected chapters)
- 6. Mahesh Rangarajan (1996) 'The Politics of Ecology: The Debate on Wildlife and People in India, 1970-95', *Economic and Political Weekly*, September, Special Number, pp. 2391-2409
- 7. Mahesh Rangarajan (2006) *Environmental Issues in India: A Reader*, Pearson. (Selected chapters)
- 8. P Leelakrishnan (2022) *Environmental Law Case Book*, Sixth Edition, Lexis-Nexis Butterworths, New Delhi. (Selected chapters)
- 9. Ramachandra Guha (2006) *How Much Should a Person Consume: thinking through the environment*, Permanent Black. (Selected chapters)
- 10. Ramachandra Guha (2014) *Environmentalism: A Global History*, India Allen Lane. (Selected chapters)
- 11. Ramachandra Guha and Joan Martínez Alier (1997) Varieties of Environmentalism: Essays North and South, Routledge. (Selected chapters)
- 12. Vasant Saberwal and Mahesh Rangarajan (eds.) (2003) *Battles over Nature: Science and the politics of conservation*, Permanent Black. (Selected chapters)
- 13. Relevant policies from website of the concerned ministries

# Semester- II

# **B.A.** (Hons./Hons. with Research) Economics

## **Course: Microeconomics- II**

Type of Course: Major

Semester: II

**Code:** 24-ECO-C-150

Credits: 4

## **I. Introduction to the Course**

This course is built on the basic microeconomics course. The course is designed to expose students to the working of the markets, and price determinations under different market conditions. This course will use both graphical/diagrammatical methods and mathematical methods to price determinations. The students will be exposed to ideal market scenario to real-life situations.

## **II.** Course Objectives

- To understand the different types of market structures, like perfect competition, monopoly, monopolistic competitions, and oligopoly market structures
- To explore how firms and industry operate under various market structures to make decisions regarding pricings and output levels.

## **III. Learning Outcomes**

- The students will demonstrate a deep understanding of different market structures, like perfect competition, monopoly, monopolistic competitions, and oligopoly.
- The students will develop both analytical and critical thinking skills by evaluating market structures, policy interventions, and implications for real world markets.
- The students will be prepared for further study or research in economics where the understanding of market structure is basic requirements.

## **IV. Course Contents**

## **Unit-1: Perfect Competition**

- Salient Features and Assumptions,
- Short run equilibrium firms and industry
- Long run equilibrium firms and industry
- Dynamic changes and Industry equilibrium
- o Perfect Competition and Optimum Allocation of Resources

## **Unit-2: Monopoly and Monopolistic Competition**

- Equilibrium of the Monopolist short run and long run
- Dynamic changes and Equilibrium of the Monopolist
- o Elasticity of Demand and Price Discrimination
- o Equilibrium of monopolist under Price Discrimination
- o Monopolistic Competition: Assumptions, Concept of product group, Excess capacity
- Chamberlin's models and criticisms of the model

## **Unit-3: Oligopoly Market Structures**

- Collusive and Non-collusive Oligopoly Introduction
- o Duopoly Models Cournot's, Bertrand's and Stackelberg's duopoly models
- o Paul Sweezy's kinked demand curve model and price rigidity
- o Cartels Joint profit maximisation and market sharing cartels
- Price Leadership Low cost price leader and dominant price leadership models
- o Critiques of the Traditional price leadership models

- 1. Varian H.R: Intermediate Microeconomics, 7th Edition 3 2.
- 2. Pindyck, Rubinfield and Mehta: Microeconomics, 6th Edition
- 3. Ferguson and Gould: Microeconomics, 6th Edition
- 4. Gravelle and Rees: Microeconomics; Pearson Education, 2nd Edition
- 5. Nicholson, Microeconomics
- 6. Koutsoyiannis, A.: Modern Microeconomics, Macmillan
- 7. Chaudhary, Kalyanjit Roy: Microeconomics
- 8. Mankiw, N. G. (2018). Principles of Microeconomics 8th ed.

## **Course: Mathematical Methods for Economics-II**

Type of Course: Major

**Code:** 24-ECO-C-151

#### Semester: II

## Credits: 4

## I. Introduction to the Course

For the strong foundation of economic modeling at under graduate level, the basic knowledge of Mathematics is essential. Therefore, this course provides an extensive and through use of mathematical concepts. In this direction students are expected to gain the knowledge of the concepts of set theory, functions and graphs, limits, continuity and single variable differential calculus, single variable optimization and integral calculus. This course has been designed keeping in mind the aforesaid need of the students. The main focus will be on understanding how the mathematical tools can be used to analyze the economic problems.

## **II.** Course Objectives

- To enhance the mathematical skills essential to study economics.
- To identify, solve and interpret the economic problem mathematically.
- To understand and create economic models.
- To explore the techniques to solve complex problems of economics.

## **III.Learning Outcomes**

At the end of the course, students are expected,

- To advance the mathematical skills necessary to study Economics.
- To know the basic concept of mathematics used in Economics.
- To understand the analytical skills required for solving problems in economics.
- To apply the various tools of mathematics in Economics.
- To evaluate the economic policy quantitatively.

## IV. Course Contents

## Unit - 1: Linear Algebra

- System of linear equations, vectors, vector operations, linear combinations of vectors, length of vectors and orthogonality, Applications in Economics
- Matrices and its types, matrix operations(row and column), determinants and its properties, singularity of a matrix, inverse of a matrix, linear independence and rank of

a matrix, solution of a system of linear equations (by Cramer's Rule, Matrix Inversion), Applications in Economics

 Solution of Homogeneous Equation System; Leontief Input-Output models (Open and Closed), Input – Output Analysis: Assumptions; Transaction matrix: Technical coefficients, Hawkin Simon Conditions, Metzler condition, Applications in Economics

## **Unit - 2: Calculus of Multivariate Functions**

Partial derivatives (two variables and many variables) and its economic relevance, Total derivatives, Derivatives of functions using chain rule, Derivative of functions defined implicitly, Homogeneous and Homothetic functions, Multivariable optimization, local and global extreme, Stationary points of a function, first and second order condition using Hessian, Point of Inflection, Saddle point, Constraint Optimization (using Lagrangian multiplier), sufficient condition (using Bordered Hessian), Optimization of economic functions, Applications in Economics.

## **Unit -III: Dynamic Analysis**

- **Continuous time:** First order linear differential equations (homogeneous and nonhomogeneous case) with constant coefficient and constant term; with variable coefficient and variable term; Dynamics of market price; Exact differential equations.
- **Discrete Time:** First order Difference equations, the stability analysis of the equilibrium (oscillatory and non-oscillatory, divergent and convergent time paths); The Cobweb model, Applications in Economics.

## V. References

1.Knut Sydsaeter and Peter J. Hammond (2005), *Mathematics for Economic Analysis*. Pearson Educational Asia: Delhi, 4th Indian reprint

2. Chiang, A. C. & Kevin Wainwright (2005) Fourth Edition): Fundamental Methods of Mathematical Economics, McGraw-Hill.

3. Allen, R.G.D.(1974), *Mathematical Analysis for Economists*, McMillan Press, London 4. Chiang. A.C. (1984), *Fundamental Methods of Mathematical Economics*, 3rd ed. McGraw-Hill

5. Hoy., M., J. Livernois, C. McKenna, R.Rees and T. Stengos: *Mathematics for Economics*, 2nd Edition Prentice Hall, India (2001)

6. Dowling, Edward T. (1992), Schaum's Outline of Theory and Problems of Introduction to Mathematics, 3rd Edition, McGraw-Hill.

## **Course: Principles of Macroeconomics**

Type of Course: Minor

**Code:** 24-ECO-M-152

## Semester: II

Credits: 4

## I. Introduction to the Course

This introductory course in Principles of Macroeconomics aims to provide students with a conceptual understanding of macroeconomic principles and stylized facts about the economy specially focus to India Economy. Through a blend of traditional and modern economic thinking, students will develop a foundational knowledge of macroeconomics. Additionally, the course will explore the workings of the Indian economy, offering students valuable insights into its dynamics. No pre-requisites for this course.

## **II.** Course Objectives

- To acquaint the students with basic concepts of the national income and to equip them with a holistic understanding of the economic activities that are organized in the economy.
- To familiarizes students with different theories about the process of stabilisation in aggregate income and employment of the economy.
- The course also provides glimpses on impact of autonomous changes in economy's income and employment such as changes in investment spending, government expenditure and taxes.

## **III. Learning Outcomes**

- Students will be equipped to understand and use the national income data to analyse the behaviour of aggregate economy.
- Students will learn about the role of different actors i.e., households, firms and government in the economy and mechanism of circular flow of income and spending in the economy.
- This course will equip students with an understanding of the fundamental principles and frameworks that will enable them to explain the working of aggregate economic variables, their interactions and therefore the economy.

## **IV. Course Contents**

## **Unit- 1: Basic Concept of National Income**

- Concepts of National Income –GNP and NNP at market price and factor cost, Gross value added (GVA) at basic price, National product and Domestic product
- Measurement of National Income– Product or Value-added Method, Income Method and Expenditure Method, difficulties in the measurement of National Income.
- Real and nominal GDP, GDP deflator.
- Trajectory of GDP in post-independent India.

## **Unit- 2: Classical Theory of Output & Employment**

- Brief history of major schools of economic thought.
- Says law of markets and Quantity theory of Money.
- Classical model without saving and Investment, Classical theory with saving and investment
- Effects of the change in Labour supply and in Change in labour demand, on the level of output employment, rigid money wage, monetary policy and full employment.

## Unit- 3: Keynesian Theory of Income and Employment

- Great Depression of the 1929 and the Keynesian Revolution.
- Keynesian approach to the determination of price, Output and Employment –The Complete Keynesian model.
- Consumption function, Saving and Investment, Concept of Multiplier, Government Expenditure Multiplier, and tax multiplier, Leakages of multiplier.

- 1. Beckerman, W. (1980). An Introduction to National Income Analysis. Littlehampton Book Services.
- 2. D'Souza E. (2009). *Macroeconomics*, Pearson Education.
- 3. Mankiw, N. (2016). *Macroeconomics*, 9th ed. Worth Publishers.
- 4. S.K. Aggarwal (2002). National Income Accounting. Worldview Publications.
- 5. Shapiro, D. (2022). *Principles of Macroeconomics 3e*. OpenStax CollegeShapiro E. Macro Economic Analysis Second Edition.
- 6. Vaish, M.C. (2010). *Macroeconomic Theory*, Vikas Publishing House Pvt.Ltd.

## **Course: Financial Economics**

**Type of Course:** Multidisciplinary Course

Code: 24-ECO-T-153

#### Semester: II

Credits: 3

## I. Introduction to the Course

The importance of financial sector in the economy has been increasing over the period of time. It is pertinent to expose students to the working of the financial markets and its potential link with real sectors of the economy. This course introduces the basic analytical tools for assessing financial market and its functioning. This course dwells on working of stock, bond, and derivative markets.

## **II. Course Objectives:**

- To provide the theoretical tools and framework to understand financial markets.
- This course intends to impart the knowledge and understanding of different types of financial markets and instruments.
- The course demystify the nexus between financial market and the economy.

## **III. Learning Outcome:**

- To be able to identify various instruments in financial markets.
- To be able to conduct fundamental analysis of stocks and bonds
- To develop computing capacities for valuation of financial assets.

## **IV.** Course Contents

## **Unit- 1: Introduction to Financial Markets**

- Capital Market Vs Money Market
- Financial Markets Role and Functions
- Types of Financial Markets Primary and Secondary Markets
- o Financial Markets -- Instruments and Transaction Mechanism in Spot Market
- Introduction to Derivatives Market Forward, Futures and Options
- o Transactions Mechanism in Derivative Markets
- Indian Financial Markets Equity Market, Bond Market, Mutual Funds and Commodity Market

## **Unit- 2: Stocks and Portfolio Analysis**

- Basic concepts of Investing
- Different types of stocks and Valuation of stocks
- Fundamental Analysis of Stocks and Investment Qualitative and Quantitative Analysis
- o Concept of Market Efficiency and Forms of Market Efficiency
- Portfolio Analysis

## **Unit- 3: Bond Market Analysis**

- Time Value of Money Present Value and Future Value
- Annuity and Perpetuity, Compounding and Discounting
- Types of Bond Pure Discount Bond, Coupon Bond, Consols
- Valuation of Bond
- o Relationship between Government Bond and Corporate Bond
- o Bond Price and Interest Rate

- 1. Bailey, R. E. (2005). The economics of financial markets. Cambridge University Press.
- 2. Bhole, L. M., & Mahakud, J. (2017). *Financial institutions and markets: structure growth and innovations*. McGraw-Hill.
- 3. Bodie, Robert c Merton and David Cleaton (2009), Financial Economics, Pearson
- 4. Elton, E. J., Gruber, M. J., Brown, S. J., & Goetzmann, W. N. (2014). Modern Portfolio Theory and Investment Analysis.
- 5. Hull, J. C., & Basu, S. (2016). *Options, futures, and other derivatives*. Pearson Education India.
- 6. LeRoy, S. F., & Werner, J. (2014). *Principles of financial economics*. Cambridge University Press.
- 7. Prasanna Chandra (2010), International Analysis and portfolio Management, Tata McGraw Hill

## **Course: Introduction to Indian Statistical System**

Type of Course: Skill Enhancement Course (SEC)

**Code:** 24-ECO-S-154

## Semester: II

Credits: 3

## I. Introduction to the Course

Indian statistical system has been a major source of the data for research and policy making on Indian economy however introduction of this source of data occurs at much later stage among students. Thid course intends to fill this void by familiarizing students with rich source of data from Indian statistical system at an early stage so that they can independently conduct research on the topics of their interest and can effectively participate in policy discussions and debates.

## **II.** Course Objectives

- To *describe* the broad features of Indian statistical system
- To *locate* the appropriate sources of data for various research issues
- To analyse (selected) surveys and reports published by Government of India

## **III. Learning Outcomes**

At the end of this course, students are expected to:

- To *recognise* the scope and limitations of data used in the context of research problems
- To connect indicators with data and data sources in India
- To critically *examine* the adequacy of analysis and results drawn by other authors using data from Indian statistical system.

## **IV. Course Contents**

## Unit 1: Emergence of Statistical System for Development and Planning

- Need for statistical system—planning and development
- Evolution of institutions to develop the Indian statistical system
  - Registrar General and Census Commissioner of India
  - Role ISI and P C Mahalanobis
  - NSSO
  - CSO
- o Ministry level statistical systems: Health, Agriculture, Rural Development
- State level statistical systems

## Unit 2: Nationally representative surveys and Census

- Idea of nationally representative sample survey
  - Purpose
  - Survey design

- Understanding and summarizing the data
- Using data to compute indicators
- Connecting the surveys with developmental questions
- National Family Health Survey
- Sample registration system (SRS)
- Contrasting Census with representative sample surveys

## **Unit 3: Macro Aggregates and Budgets**

- Gross Domestic Product)
  - Examples of estimating sectoral value added in national Accounts.
  - Nominal vs real
  - Base years
- Union and State Budgets
  - Role of national finance commissions
  - Budget Estimates (BE), Revised estimates (RE) and Actuals

## **IV. References**

- 1. Rukmani, S. (2021). *Whole numbers and half truths: What data can and cannot tell us about modern India*. Context (publisher).
- 2. Menon, N. (2022). *Planning Democracy: Modern India's Quest for Development*. Cambridge University Press.
- 3. Bhattacharya, P. (2023). India's Statistical System: Past, Present, Future Carnegie Endowment for International Peace
- 4. Historical Perspective of Official Statistics in India https://unstats.un.org/unsd/wsd/docs/India\_wsd\_history.pdf
- 5. Rao, T. J. (2010). Official Statistics in India: The past and the present. *Journal of Official Statistics*, 26(2), 215.
- 6. Ghosh, J. K., Maiti, P., Rao, T. J., & Sinha, B. K. (1999). Evolution of statistics in India. *International Statistical Review/Revue Internationale de Statistique*, 13-34.
- 7. Mohan, R. (2007). Statistical System of India: Some Reflections (No. id: 1061).
- 8. Latest Reports of NSSO survey on various themes
- 9. Reports of Comptroller and Auditor General of India
- 10. Reports of Annual Survey of Industry
- 11. Adhikari Committee Report of the Committee on Private Final Consumption Expenditure

https://mospi.gov.in/sites/default/files/publication\_reports/Adhikari\_Committee\_PFC E\_22may15.pdf

- 12. Latest Report of Economic census
- 13. Latest Report of Agriculture census
- 14. Latest Report of Livestock census
- 15. Naoroji, D. (1901). Poverty and un-British rule in India. London S. Sonnenschein 1901.

## **Course: Introduction to Environmental Studies**

Type of Course: Value Added Course (VAC)

Code: 24-ECO-V-155

## Semester: II

Credits: 2

## I. Introduction to the Course

Over the years, degradation of environment and depletion of natural resources have increased. India is no exception. Intensity of degradation and depletion has increased in the present century, as per periodic Assessment Reports published by many international organisations, including Inter-governmental Panel on Climate Change (IPCC). This course has been designed to provide an introduction to some matters connected with degradation and degradation of environment, primarily in India. Economic approach will be used mostly. However, no prior knowledge of economics is required.

## **II.** Course Objectives

- To *connect* flow of ecosystem services with human well-being
- To *analyse* the causes behind rise in pollution, degradation of ecosystems and depletion of natural resources
- To *connect* access to natural resources and exposure to pollution with changes in human well-being
- To *analyse* select environmental regulations in India to prevent or reduce the intensity of depletion and degradation of environment

## **III. Learning Outcomes**

At the end of the course, students are expected,

- To *identify* the attributes and characteristics of different components of environment
- To *connect* depletion/ degradation of environment and its differential impacts on various categories of people
- To *assess* the expectations from and effectiveness of laws and regulations to address depletion and degradation of environment in India

## **IV. Course Contents**

## Unit-1: Ecosystem Services and Human Well-being

- o Open, closed and isolated systems
- Ecosystems—definition, types, categories
- Ecosystem functions and ecosystem services
- o Ecosystem services and human well-being
- Trade-off between ecosystem services
- o Degradation of ecosystems—originating from human activities
- State of (selected) ecosystems in India
- o Management of ecosystems

## **Unit-2: Natural Resources**

- Classification of natural resources
- Different types of natural resources (forests, minerals, water, land, and energy), and their contribution to human well-being
- Common pool resources (CPR) in India
- Degradation of CPRs in India

## **Unit-3: Introduction to Environmental Regulations and Cases in India (selected)**

- Environment (Protection) Act (1986)
- The Energy Conservation Act (2001)
- Biological Diversity Act (2002)
- Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (2006)
- National Green Tribunal Act (2010)
- Major environmental judgments from Supreme Court (including M C Mehta cases, and Godavarman)

- Chhatrapati Singh (1987) 'Emerging Principles of Environmental Laws for Development' in J Bandyopadhyay, N D Jayal, U Schoettli and Chhatrapati Singh (eds.) *India's Environment: Crises and Responses*, Second Edition, Natraj Publishers, Dehra Dun, pp. 247-75
- 2. CPCB (2021) *Pollution Control Acts, Rules, & Notifications Issued Thereunder*, Delhi: Central Pollution Control Board, available online at https://cpcb.nic.in/7thEditionPollutionControlLawSeries2021.pdf
- 3. Herman Daly and Joshua Farley (2003) *Ecological Economics: Principles and Applications*, Second Edition, Island Press. (Selected chapters)
- 4. M N Murty and Sushama Murty (2024) 'Economic Instruments and Economic Regulators: With applications to the case of India', Discussion Paper 21-04, CITD, JNU, New Delhi
- 5. Millennium Ecosystem Assessment (2005) Chapters 1-3 in *Ecosystems and Human Well-being: A Framework for Assessment*, Island Press, Washington, DC. Available online at <u>https://www.millenniumassessment.org/en/Framework.html#download</u>
- Partha Dasgupta (2005) 'Common Property Resources: Economic Analytics', *Economic and Political Weekly*, April 16, pp. 1610-1622, available online at <u>https://www.epw.in/system/files/pdf/2005\_40/16/commonpropertyresourceseconomic</u> <u>analytics.pdf</u>
- 7. Rabindranath Bhattacharya (ed.) (2001) *Environmental Economics- An India Perspective*, Oxford University Press, New Delhi. (Selected chapters)
- 8. Ramprasad Sengupta (2001) *Ecology and Economics: An Approach to Sustainable Development*, Oxford University Press, New Delhi. (Selected chapters)
- 9. Ramprasad Sengupta (2013) *Ecological Limits and Economic Development*, Oxford University Press, New Delhi. (Selected chapters)
- 10. Shyam Divan and Armin Rosencranz (2001) *Environmental Law and Policy in India*, Second Edition, OUP, New Delhi. (Selected chapters)
- 11. Relevant Supreme Court judgments from <u>https://main.sci.gov.in/judgments</u>

# **Semester- III**

## **B.A.** (Hons./Hons. with Research) Economics

## **Course: Macroeconomics-I**

Type of Course: Major

Semester: III

Code: 24-ECO-C-200

Credits: 4

## **I. Introduction to the Course**

This course is designed for the under-graduate students which focuses on basic concepts of macroeconomics. This course discusses the nature and scope of macroeconomics, brief history of different schools of macroeconomics, macroeconomic problems and policy instruments. This course also discusses the determination of aggregate macroeconomic variables particularly output and employment in Classical and Keynesian framework.

## **II.** Course Objectives

- This course provides basic concepts of Macroeconomics.
- It discusses the importance of aggregate macroeconomic variables like GDP, output, and employment.
- It also introduces the students to simple Classical and Keynesian analysis of macroeconomic policies.

## **III. Learning Outcomes**

At the end of this course students should be able to:

- Get an overall understanding of macroeconomic fundamentals.
- Provide basic understanding of Classical and Keynesian analysis of employment and output determination in an economy.
- Evaluate important macroeconomic policies & their implications.

## **IV. Course Contents**

## **Unit-1: Introduction to Macroeconomics**

- Nature and Scope of Macroeconomics
- Meaning and definition of key macroeconomic variables (GDP, output, unemployment, inflation etc),
- Macroeconomic problems, goals and instruments
- Circular flow model of an economy with injections and leakages
- o real versus nominal GDP, price indices
- brief history and Schools of Macroeconomics

## **Unit-2: Classical Theory of Output and Employment**

- o Say's law of Market
- Quantity Theory of Money, Classical Model without saving and investment, Classical Theory with Saving and Investment
- Effects of a change in labour supply and a change in labour demand on the level of output and employment.
- Wage Determination: Natural Rate of Unemployment, Rigid Money Wage
- Monetary Policy and Full Employment

## Unit-3: Keynesian Theory of Output and Employment

- The Keynesian Approach to the Determination of Price, Output and Employment: The Complete Keynesian Model.
- Derivation of Aggregate Demand and Aggregate Supply Curves, Consumption Function, Saving and Investment Equality
- Concept of Multiplier: Government Expenditure Multiplier, Tax Multiplier and Leakages of Multiplier

## II. References

- 1. Blanchard O., Macro Economics 7th Edition
- 2. Bradley R. Schiller, Macro Economy Today, Eleventh Edition, Tata Mcgraw-Hill.
- 3. John Lindauer. Macroeconomics Third Edition.
- 4. Lioyd G.Reynolds Macroeconomics Analysis and Policy Sixth Edition.
- 5. N. Gregory Mankiw, Macroeconomics
- 6. Richard T Froyen, Macro Economics: Theories and Policies 7<sup>th</sup> Edition
- 7. Rudiger Dornbush, Stanley Fischer, Richard Startz, Macroeconomics Eleventh Edition.
- 8. S. K. Aggarwal, National Income Accounting Latest Edition.
- 9. Shapiro E., Macro Economic Analysis Second Edition.
- 10. Wilfred Beckerman, An Introduction to National Income Analysis.
- 11. William Branson, Macro Economic Theory and Policy
- 12. William H. Branson, Macroeconomic Theory and Policy Second Edition.
- 13. William J. Baumol, Macroeconomics Theory and Policy

## **Course: Statistical Methods-I**

Type of Course: Major

Code: 24-ECO-C-201

## Semester: III

## Credits: 4

## I. Introduction to the Course

To develop the basic understanding of economic modeling at undergraduate level, basic knowledge of statistics is essential. Therefore, this course provides the thorough use of statistical concepts. In this direction, students are expected to gain knowledge of the concepts of statistics in economics. The focus will be on understanding how statistical tools can be used to analyze economic problems.

## **II.** Course Objectives

- Know the basic concept of Statistics used in Economics;
- Advance the Statistical skills necessary to study Economics through data driven insights
- Classify and organize the data for economic interpretation

## III. Learning Outcomes

At the end of this course students should be able to:

- Learned the analytical skills required to estimate the indicator performance based on large data
- Apply the various tools of Statistics in economic analysis
- Evaluate the policy options in economics quantitatively

## **IV. Course Contents**

## **Unit-1: Descriptive Statistics and Data Summarization**

- Definition and Role of Statistics; Types of Data-Quantitative, Qualitative, Scales of Measurement- Nominal, Ordinal, Interval, Ratio;
- Measures central tendency: Median, Mode, Mean, Harmonic Mean, Geometric Mean, simple and weighted averages, group averages;
- Measures of dispersion: Range, Variance and Standard Deviation, Mean Deviation,
   Quartile Deviation, Measures of Skewness and kurtosis; Measures of economic inequality;
- Graphic Presentation of Data: Bar Plot, Pie Chart, Histogram, Density Plot, Box Plot, Scatter Diagram, Cross-tabulation.

## **Unit-2: Probability and Probability Distributions**

- Random experiment, sample space and events;
- Classical, empirical and axiomatic definitions of probability; addition and multiplication theorems;
- Conditional probability, independent events and Baye's rule;
- Random variable; mathematical expectation -mean and variance of a random variable, Binomial, Poisson and Normal distributions.

## **Unit-3: Index Numbers and Time Series Analysis**

- Index Numbers: Concept and uses; Laspeyres, Paasche's and Fisher's index numbers; time reversal, factor reversal and circular tests; problems in constructing index numbers; splicing, base shifting; use of index numbers for deflating other series.
- Time Series Analysis: Concept and uses; Components of time series; Methods of moving averages and least squares.

- 1. Allen, R.G.D. (1949). *Statistics for Economists*. Hutchinson's University Library, London, UK.
- 2. Croxton, F.E., D.J. Cowden and S. Klein (1973). *Applied General Statistics*. Prentice Hall, New Delhi.
- 3. Freund John E. & Ronald E. Walpole (1987). *Mathematical Statistics*. Prentice-Hall of India, New Delhi.
- 4. Gupta, S.C. & V.K. Kapoor (1993). *Fundamentals of Applied Statistics*. S. Chand and Sons, New Delhi.
- 5. Nagar, A.L. and R.K. Das. (1983). Basic Statistics. Oxford University Press, New Delhi
- 6. Gupta, S. P. (2005). Statistical Methods. S. Chand & Sons, New Delhi
- 7. Freund, John E. (1979). *Modern Elementary Statistics*. Prentice Hall of India, New Delhi.
- 8. Speigal, M.R. (1992). Theory and Problems of Statistics. McGraw Hill Book, London.
- 9. Thukral, J. K. (2010). Business Statistics. Taxmann Publications, New Delhi
- 10. P.H. Karmel and M. Polasek (1978). *Applied Statistics for Economists*, (4<sup>th</sup> Ed). Pitman, Australia
- 11. Allen Webster (1997), Applied Statistics for Business and Economics: an Essential Version, (3<sup>rd</sup> Ed). McGraw-Hill.
- 12. Lind, Douglas A., William G. Marchal, and Samuel A. Wathan (2006). *Business Statistics for Business & Economics*, 5th ed. Boston: McGraw-Hill Irwin.

## **Course: Foundations of Mathematics for Economics**

Type of Course: Minor

**Code:** 24-ECO-M-202

## Semester: III

## Credits: 4

## I. Introduction to the Course

Mathematics is a fundamental tool that helps us understand and analyze the world around us. While often associated with complex theories and abstract concepts, this course is designed to make mathematics accessible and practical for students from diverse academic backgrounds, especially those not specializing in economics. This course focuses on essential mathematical concepts that are widely applicable in field of economics.

## **II.** Course Objectives

- To enhance mathematical skills essential to study economics.
- To identify, solve and interpret the economic results mathematically.
- To understand economic models.

## III. Learning Outcomes

At the end of the course, students are expected,

- Able to create graphs and interpret graphical functions.
- Demonstrate the use of calculus in economic optimization
- Build simple economic models

## **IV.** Course Contents

## Unit -1: Basic concepts, Functions and Graphs

- Sets and set operations, Ordered pairs, the real numbers, natural numbers, integers, rational and irrational numbers; absolute value and intervals; inequalities.
- The general concept of function, types of function (linear, quadratic, power, exponential, inverse); graphs of functions; Applications in Economics

## Unit-2: Limits, Continuity and Single variable Differential Calculus

- Limits, continuity and differentiability, rules of differentiation (simple differentiation, sums, products, and quotients);
- Second and higher order derivatives, power rule, chain rule, implicit differentiation;
- o Linear approximation and differentials; Quadratic approximations
- o Elasticity
- Intermediate-value Theorem; the Extreme-value Theorem; The Mean-value Theorem; Indeterminate forms and L'Hopital's rule; Applications in Economics

## **Unit-3: Single variable optimization and Integral Calculus**

- Stationary points of a function, Maxima and Minima (local and global); Convexity and Concavity of functions; Points of inflection; Optimization of economic functions
- Rules of integration, integration by parts, integration by substitution, indefinite integral, Definite Integral, Proper and Improper integral; Areas under curves and economic application of integration.

- 1. Allen, R.G.D.(1974), Mathematical Analysis for Economists, McMillan press, London
- Chiang, A. C. & Kevin Wainwright (2005) (Fourth Edition): Fundamental Methods of Mathematical Economics, McGraw-Hill.
- 3. Chiang, A. C. (1984), Fundamental Methods of Mathematical Economics, 3rd Ed, McGraw-Hill.
- 4. Dowling, Edward T. (1992), Schaum's Outline of Theory and Problems of Introduction to Mathematical Economics, 3rd Edition, McGraw Hill.
- 5. Handerson, Quandt. (1980). Microeconomic Theory, A Mathematical Approach, Third Edition, McGraw Hill.
- 6. Hoy, M., J. Livernois, C. McKenna, R. Rees and T. Stengos(2001), Mathematics for Economics, 2nd Edition Prentice Hall, India.
- Knut Sydsaeter and Peter J. Hammond (2005), *Mathematics for Economic Analysis*. Pearson Educational Asia: Delhi, 4th Indian reprint.
- Rosser, Mike. (2003). Basic Mathematics for Economists, Second Edition, Routledge, Taylor & Francis Group

## **Course: National Income Accounting**

**Type of Course:** Multidisciplinary Course

**Code:** 24-ECO-T-203

Semester: III

Credits: 3

## I. Introduction to the Course

National Income Accounting (NIA) is a subject that is becoming increasingly relevant given the debates around data and GDP estimates. Social Accounting system allows us to understand the nitty gritty of macro-economic aggregates that students of social sciences use on everyday basis. Further it greatly enhances students research capability in the area of macroeconomics and disparities across factors of production.

## **II. Course Objectives**

- To appreciate the need for a system of social (national income) accounting.
- To acquire a reasonable command over (selected) national income accounting procedures in Indian context.
- To equip students with the skills to understand measures of size of the economy produced by Accounting System.

## **III. Learning Outcomes**

- To be able to calculate and differentiate various macroeconomic aggregates using official data.
- To be able to understand various government publications and reports on national/macro economy.
- To hone the skills for future research and learning connected with macroeconomic accounting.

## **III.** Course Contents

## Unit-1: Social or National Income Accounting: Basic concepts

- Income vs capital
  - Generic idea of stocks vs flows
- Intermediate, final product
- Production boundary
- Historical evolution in the definition of production boundary
- Concept value added
- Depreciation of capital stock
- Values at market price, basic price and factor cost
- Imputing for unpaid services and products in economy
- Depreciation or appreciation for natural capital and commons
- o Input-output transaction matrix of national economy

## **Unit-2: Methods of Arriving at National Income**

• Expenditure method

- Value added method
- Income method
- Treatment of government services in assessing national income
- Concept of operating surplus
  - Labour vs non-labour income
  - Gauging inequality in the economy through income method

# Unit-3: Estimating the Value of Output in Various Sectors of Economy: The Indian Approach

- Indian System of National Accounts
- Valuation of agriculture, forestry & fishing
- Estimation of organised and unorganised manufacturing
- o Valuing financial and non-financial services
- Importance of base years
- Nominal vs real value
- Recent debates in GDP estimation

## V. References

- 1. Abraham, W. I. (1969). National Income and Economic Accounting, Prentice-Hall.
- 2. Adhikari Committee Report of the Committee on Private Final Consumption Expenditure

https://mospi.gov.in/sites/default/files/publication\_reports/Adhikari\_Committee\_PFC E\_22may15.pdf

- 3. Aggarwal, S.K. (2002) National Income Accounting. Worldview Publications
- 4. Beckerman, W. (1980) An Introduction to National Income Analysis. Littlehampton Book Services.
- 5. Bhatia D.P. (1996). National Accounting: Concepts and Estimates. Khama Publishers, New Delhi.
- 6. CSO National Account Statistics
- 7. CSO National Accounts Statistics (Sources and Methods)
- 8. CSO. (2015). Changes in Methodology and Data Sources in the New Series of National Accounts. *Base Year 2011–12*.
- 9. Mathews, R. (1969) Accounting for Economics.
- 10. Mazzucato, M. (2018). *The value of everything: Making and taking in the global economy*. Hachette UK. Introduction Chapter.
- 11. Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press. Chapter 1.
- 12. Rao V.K.R.V. (1934) an Essay on India's National Income, 1925-29.
- 13. Rastogi, S. and Aiyar S. (1997), National Income Accounting, Lotus Books.
- 14. Rosen, S. (1972). National income and other social accounts.
- 15. Schultze, C. L. (1964). National Income Analysis. India: Prentice-Hall.
- 16. Stone, R., & Stone, G. S. (1966). National income and expenditure.
- 17. Studenski, P. (1958). The Income of Nations Theory, Measurement, and Analysis: Past and Present. University Press.
- 18. Studenski, P. (1961). Income of Nations. New York University Press.
- 19. UN (2009). System of National Accounts 2008.

## **Course: Labour Economics**

Type of Course: Ability Enhancement Course (AEC)

**Code:** 24-ECO-A-204

## Semester: III

Credits: 2

## I. Introduction to the Course

This course provides an overview of labour economic at undergraduate level. Therefore, this course provides an extensive and through insights of labour economic concepts and theories. This course has been designed keeping in mind the aforesaid need of the students. The main focus will be on understanding how the labour economic theories can be used to analyze the wages and employment problems and policies that affect employment and wages.

## **II.** Course Objectives

- Address the issue of Gender and Social Equity in Labor Markets
- Examine the Impact of Technological Change on Labor Markets
- Know the Labor Market Mechanisms

## **III. Learning Outcomes**

At the end of this course students should be able to:

- Analyze the Wage Determination and Income Distribution
- Understand the Labor Productivity and Efficiency
- Evaluate the Labor Policies and its Impact.

## **IV. Course Contents**

## Unit-1:

- o Introduction to labour economics: Concept and scope of labour economics
- Concept, significance and peculiarities of labour
- o Nature and characteristics of labour markets in developing countries
- Concept and Determinants of labour force participation
- Unemployment: Concept, measurement & types; Migration: Classical, neo-classical and dualistic theories of labour markets: Demand for labour-Short and long run.

## Unit-2:

- Labour Markets and Wage labour markets: Formal and informal
- Wages: Concept and types; Theories of wage determination: Classical, Neo-classical and bargaining theories; Concept of minimum wage
- Living wage and fair wage
- Wage determination in organized and unorganised sector; Non-wage component of labour remuneration
- Five year Plans- Employment Policy of India.

## Unit-3:

- o Labour Policies and Issues; Concept of Industrial relations
- o Labour Productivity Growth, Structure and pattern of trade unions in India
- Settlement and Collective bargaining, conciliation
- o arbitration and labour participation in management. Appraisal of Indian State policies
- Special problems of labour: Child labour, Female labour, Discrimination and Gender bias
- Reforms in India Labour market.

- 1. Das, N. (1960). Unemployment, Full Employment and India. Asia Publishing House, Bombay.
- 2. Datt, G. (1996). *Bargaining power wages and Employment: An Analysis of Agricultural labour Markets in India.* Sage Publications, New Delhi.
- 3. Deshpande L.K. and J.C. Sandesara, (Eds.) (1970). *Wage Policy and Wages Determination in India*. Bombay University Press, Bombay.
- 4. Hajela, P.D. (1998). *Labour Restructuring in India: A Critique of the New Economic Policies*. Commonwealth Publishers.
- 5. Hicks J.R. (1932). *The Theory of Wages*. Clarendon Press, Oxford.
- 6. Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000). *The Unorganised Sector Work Security and Social Protection*. Sage Publications, New Delhi.
- 7. Lester, R.A. (1996). *Economics of labor* (2<sup>nd</sup> Ed). Macmillan, New Youk.
- 8. Mazumdar, D. (1989). *Micro-economic Issues of Labour Markets in Developing Countries*, EDI Services Paper No.40. World Bank, Washington D.C.
- 9. McConnell, C.R. and S.L. Brue. (1986). *Contemporary Labor Economics*. McGrawhill, New york.
- 10. McCormickm B. & Smith (Eds.) (1968). *The Labour Market*. Penguin, Harmondsworth.
- 11. Memoria, C.B. (1966). *Labour Problems and Social Welfare in India*. Kitab Mahal, Allahabad.
- 12. Misra, L. (2000). *Child Labour in India*. Oxford University Press, New Delhi.
- 13. Papola, T.S., P.P. Ghosh and A.N. Sharma (Eds.) (1993). *Labor Employment and Industrial Relations in India*. B.R. Publishing Corporation, New Delhi.
- 14. Punekar, S.D. (1978). Labour Welfare, Trade Unionism and Industrial Relations. Himalaya Publishing House, Bombay.
- 15. Riveros, L. (1990). Labour Market Policies and Labour Market Reforms in Socialist *Economies*. World Bank, Washington D.C.
- 16. Rosenberg M.R. (1988). *Labour Markets in Low Income countries* in Chenary, H.B. and T.N. Srinivasan (Eds.). The Handbooks of Development Economics, North-Holland, New York.
- 17. Singh V.B. (Eds.) (1970). Industrial Labour in India. Popular Parakashan, Bombay.
- 18. Venkata Ratnam, C.S. (2001). *Globalization and Labour-Management Relations: Dynamics of Change*. Sage Publications / Response Books, New Delhi.

## **Course: Economics of Environment**

Type of Course: Value Added Course (VAC)

Code: 24-ECO-V-205

#### Semester: III

Credits: 2

## I. Introduction to the Course

Economic activities depend on inputs drawn from nature. Undesirable by-products like pollution impacts nature. They in turn affect the flow of inputs from nature to economic systems. Economically valuable outputs and undesirable by-products are joint products. Reducing one will imply reducing the other one too. Is there a socially desirable level of output, where benefits to the society from the valuable output net of losses owing to undesirable by-products, is maximum? This is one of the questions that this paper asks. Another aspect is valuing the costs and benefits of using nature for economic reasons, at a point of time and over time—and how to account for them. The course also looks at the effectiveness of economic instruments to address environmental problems, at national as well as global levels.

For this course knowledge of mathematics at Class X is necessary.

## **II.** Course Objectives

- To *identify* the economic dimensions of nature
- To *appreciate* the contributions of nature in economic systems
- To *understand* economic methods to value different aspects of nature
- To *analyse* economic instruments to address environmental matters

## **III. Learning Outcomes**

At the end of the course, the students are expected,

- To be able to *explain* foundational aspects of economics of environment
- To *recognize* the significance of nature in sustaining economic systems
- To *distinguish* between different methods to evaluate nature's contribution to economic systems
- To *evaluate* the effectiveness of different economic instruments to address environmental problems

## **IV.** Course Contents

## **Unit-1: Introduction**

- Major challenges before the society: climate change, access to water, desertification, forest cover depletion and energy transition—economic aspects
- Economy- Environment Linkages
- Conceptual matters: static efficiency, property rights, market equilibrium
- Environmental degradation as a case of market failure—externality, public goods, common property resources

## Unit-2: Environment and economic decision-making

- Types of values: use value and non-use value
- Conceptual matters: WTP and WTA for substitute and complementary goods, and discount rate
- o Non-market valuation methods: revealed preference and stated preference
- o Cost Benefit Analysis
- o Economics of non-renewable resources: optimal extraction path
- Economics of renewable resources: Maximum Sustainable Yield and Faustmann rotation

## Unit- 3: Economic policies to address environmental problems

- Internalising the externality: direct regulation, economic instruments (tax, subsidy, deposit system, emission trading), voluntary bargaining
- Instruments: ecolabelling, carbon credit, biodiversity offset, payment for ecosystem services
- Global policies Clean Development Mechanism, REDD+, Paris agreement, Convention on Biological Diversity

- 1. Charles D. Kolstad (2010) *Environmental Economics*. Second edition. Oxford University Press.
- 2. Jason F. Shorgen, ed. (2013) Encyclopedia of Energy, Natural Resource, and Environmental economics. Elsevier.
- 3. Kentaka Aruga (2022) Environmental and Natural Resource Economics. Springer. (Text)
- 4. M. Verma, A. Edgaonkar, D. Negandhi, C. Khanna, R. Agarwal, C. Tiwari (2017) Valuation of Ecosystem Services from Tiger/ Snow Leopard Landscapes: A manual on economic valuation approaches for practitioners. Indian Institute of Forest Management, Bhopal, India.
- 5. Tom Tietenbeg and Lynne Lewis (2024) *Environmental and Natural Resource Economics*. 12<sup>th</sup> Edition. Routledge. (Text)

# Semester- IV

## **B.A.** (Hons./Hons. with Research) Economics

## Course: Macroeconomics-II

Type of Course: Major

#### Semester: IV

**Code:** 24-ECO-C-250

## Credits: 4

## I. Introduction to the Course

This course introduces the students to theories of consumption, investment and rate of interest. It discusses various alternative theories of output and employment determination in a closed economy using analytical framework like IS-LM model and role of macroeconomic policies. This course also discusses the concepts of inflation and business cycle.

## **II. Course Objectives**

- This course provides basic understanding of major theories of consumption and investment in macroeconomics.
- It discusses the determination of aggregate macroeconomic variables like saving, interest rate, investment, output, and inflation.
- It also introduces students to simple analytical frameworks (e.g. the IS-LM model) for determination of equilibrium output.

## **III. Learning Outcomes**

At the end of this course students should be able to:

- Analyse the major macroeconomic issues and their implications to the real economy.
- To introduce basic concepts of the money market and product market
- Learn the connection between macroeconomic variables and fiscal and monetary policies through IS-LM model.

## **IV. Course Contents**

## **Unit-1: Theories of Consumption & Investment**

- General Theories of Spending Behaviour: Absolute Income Hypothesis, Relative Income Hypothesis, Permanent Income Hypothesis, Life Cycle Hypothesis, Fisher's Optimal Intertemporal Choice
- Motivation for Investment: Determination of Business Investment, Residential Investment and Inventory Investment, Marginal Efficiency of Capital, Supply Price, Expected Income Streams, Marginal Efficiency of Capital and Interest Rate, Acceleration Principle.

## **Unit-2: Keynesian Theory of Money and Interest**

 Keynesian Theory of Interest, Determination of Rate of Interest, Changes in the levels of Income, Demand for Money and Supply of Money and their Effect on Equilibrium Rate of Interest, Liquidity Trap and Policy Implications • IS and LM Curve Analysis: The General Equilibrium of Product and Money Market, Relative Effectiveness of Monetary and Fiscal Policies.

## **Unit-3: Theory of Inflation and Business Cycle**

- o Types and Theories of Inflation, Demand Pull and Cost Push Inflation,
- The Phillips Curve: Trade-off between Inflation and Unemployment,
- Concept and Phases of Business Cycle, Innovation Theory, Keynesian Theory, Monetary Theory.

- 1. Blanchard O., Macro Economics 7<sup>th</sup> Edition
- 2. Bradley R. Schiller, Macro Economy Today, Eleventh Edition, Tata Mcgraw-Hill.
- 3. John Lindauer, Macroeconomics Third Edition.
- 4. Lioyd G. Reynolds, Macroeconomics Analysis and Policy Sixth Edition.
- 5. N. Gregory Mankiw, Macroeconomics
- 6. Richard T Froyen, Macro Economics: Theories and Policies 7<sup>th</sup> Edition
- 7. Rudiger Dornbush, Stanley Fischer, Richard Startz, Macroeconomics Eleventh Edition.
- 8. S. K. Aggarwal, National Income Accounting Latest Edition.
- 9. Shapiro E., Macro Economic Analysis Second Edition.
- 10. Wilfred Beckerman, An Introduction to National Income Analysis.
- 11. William Branson, Macro Economic Theory and Policy
- 12. William H. Branson, Macroeconomic Theory and Policy Second Edition.
- 13. William J. Baumol, Macroeconomics Theory and Policy

## **Course: Statistical Methods-II**

## **Type of Course:** Major **Semester:** IV

## Code: 24-ECO-C-251 Credits: 4

## I. Introduction to the Course

The knowledge of statistics plays a crucial role in economics as it provides various tools for analyzing the big data, testing the theories and apprising the policy decisions. Therefore, to develop understanding of economic modeling at under graduate level, learned statistics is crucial for students. The main focus of this course will be on understanding concepts and tools of statistical which help to analyze the real economic phenomena.

## **II.** Course Objectives

- To apply the statistical inference for economic decisions
- To provide data-driven insights for designing economic policies
- To analyze the economic trends, patterns, and relationships using statistical methods.

## **III. Learning Outcomes**

At the end of this course students should be able to:

- Facilitates the evidence-based decisions in both public and private sectors
- Refine the economic models for better predictive accuracy
- Measures the impact of policies on economic growth and social well-being.

## **IV. Course Contents**

## Unit-1: Uni-variate and Bi-variate Analysis

- Moments and moment generating function (M.G.F.), Multivariate Statistics joint, marginal and conditional distribution;
- Product moment– covariance, correlation, rank correlation, Simple linear regression; method of least squares; linear and exponential trend.

## **Unit- 2: Sampling and Sampling Distributions**

o Population Versus Sample, IID Random Variables, Sampling Errors; Non-Random or

Judgement Sampling, Methods of Random Sampling – Simple Random, Cluster, Stratified, Systematic; Sample Statistic – Sample Mean and Sample Variance; Standard Error.

- Methods of Finding Sampling Distributions Direct Method, Transformation of Variables Method.
- Z, Chi-Square, T and F Distributions.
- Chebyshev's Inequality, Law of Large Numbers, Central Limit Theorem, Sampling Distribution of Sample Mean, Sampling Distribution of Sample Variance.
- Sampling from Finite and Infinite Population, Finite Population Correction Factor, Sampling from Normal Population.

## **Unit-3: Methods of Statistical Inference**

- Desirable Properties of An Estimator Unbiasedness, Consistency, Efficiency and Sufficiency. Robustness, Mean-Squared Error. Consistency and Best Asymptotically Normal Estimator, Cramer-Rao Inequality, Interval Estimation - Confidence Intervals For Mean and Variance
- Testing of Hypothesis- Types of Errors, Level of Significance, Power of a Test, Interpretation of P-Value; Most Powerful Test – Neyman-Pearson Lemma.
- Definitions and Uses of Z, Chi-square, t and F statistics, large sample and small sample tests for mean, one tail and two tail tests for difference of means; Chi-Square Tests – Goodness of Fit Test, Test for Independence, Homogeneity Test; F-test for ratio of two variances, oneway analysis of variance.

- 1. Allen, R.G.D. (1949). Statistics for Economists. Hutchinson's University Library, London, UK.
- 2. Croxton, F.E., D.J. Cowden & S. Klein (1973). *Applied General Statistics*. Prentice Hall, New Delhi.
- 3. Gupta, S.C. & Kapoor, V.K. (1988). *Elements of Mathematical Statistics*. S. Chand & Sons, New Delhi.
- 4. J. E. Freund. (1999). *Mathematical Statistics*, (5<sup>th</sup> Ed). Prentice-Hall International.
- 5. J. E. Freund and R. E. Walpole. (1987). *Mathematical Statistics*, (5<sup>th</sup> Ed). Prentice-Hall inc.
- 6. Hogg, R.V. and Craig, A.T. (1995). *Introduction To Mathematical Statistics*. Prentice-Hall International, inc. Engle Wod Cliff, N.J.
- 7. Mood, A.M. Graybill, F.A. and Boes, D.C. (1974). *Introduction to the Theory of Statistics*, (3<sup>rd</sup> Ed). Mcgraw-Hill Book Company, New York.
- 8. Hogg, R. V. and A. T. Craig. (1970). *Introduction to Mathematical Statistics* (3<sup>rd</sup> Ed). Macmillan Publishing Co., New York.
- 9. Sukhatme, P. V. and B. V. Sukhatme (1970). *Sampling Theory of Survey With Applications*. Lowa State University Press, Ames.
- 10. J. A. Rice (1995). *Mathematical Statistics and Data Analysis*, (2<sup>nd</sup> Ed). Duxbury Press.

- 11. Hogg, R.V. and Tanis E.A. (1993). *Probability and Statistical inference*, (4<sup>th</sup> Ed). Macmillan Publishing Company, New York.
- 12. S. C. Gupta. (1993). Fundamentals of Applied Statistics, S. Chand and Sons, New Delhi.
- 13. D. Gujrati. (2002). Basic Econometrics, (4th Ed). Mcgraw-Hill/Irwin.
- 14. D. G. Rees. (1987). Foundation of Statistics. Chapman & Hall.
- 15. G. M. Clarke and D. Cooke. (1992). A Basic Course in Statistics, (3rd Ed). Arnold.
- 16. R. L. Schaeffer. (1990). Introduction to Probability and its Applications. Pws-Kent.
- 17. F. Daly, D. J. Hand, M. C. Jones, A. D. Lunn, K. J. Mcconway. (1995). *Elements of Statistics*. Addison-Wesley.
- 18. S. Ross. (1976). A First Course in Probability. Macmillan.
- 19. Chou, Y. (1975). Statistical Analysis. Holt, Reinhart and Winston, New York.
- 20. Croxton, Crowden and Klein. (1971). *Applied General Statistics*, Prentice Hall of India, New Delhi.
- 21. Millar, J. (1996). *Statistics For Advanced Level*. Cambridge University Press, Cambridge.
- 22. Lind, Douglas A., William G. Marchal, & Samuel A. Wathan. (2006). *Business Statistics for Business & Economics*, (5<sup>th</sup> Ed). Boston: McGraw-Hill Irwin.
- 23. P.H. Karmel and M. Polasek. (1978). *Applied Statistics for Economists*, (4<sup>th</sup> Ed). Pitman, Australia.
- 24. Kapur, J.N. & Saxena, H.C. (1988). *Elements of Mathematical Statistics*. S. Chand & Sons, New Delhi.
- 25. Nagar, A.L. & R.K. Das. (1983). Basic Statistics. Oxford University Press, New Delhi.

## **Course: Indian Economy**

Type of Course: Major

Code: 24-ECO-C-252

Semester: IV

Credits: 4

## I. Introduction to the Course

This course provides an overview of Indian Economy and introduces the working of Indian Economy under the post-independence era along with an overarching discussion of the enduring effects of the colonial regime on Indian economy. The course intends to develop a deeper insight of interconnection that exists among different sectors of the economy through examination of intended and unintended consequences of various policy choices. By providing comprehensive review of major debates pertaining to various sectors of the economy this course builds on existing theoretical training on economic theory of course participants while exposing students to major policy challenges that India faces.

## **II.** Course Objectives

- Students will be exposed to the importance of the historical perspective of the Indian economy and characteristics of a developing economy.
- It will equip students with the rationale behind success and failure of various policies adopted since independence.
- Students will be exposed to interdependencies in working of the different sectors of the economy and its impact on economic growth, poverty, Inequality and employment.

## III. Learning Outcomes

- Students will be able to apply their analytical skills on sectoral data to develop insights on real world socio-economic problems.
- Development of critical thinking about policy choices, pre-existing arguments, relevance of evidence on Indian Economy.
- Students will be able to assess contemporary economic issues like progress of SDGs, globalization, fiscal and monetary policy, and impact of Artificial intelligence (AI) on productivity and employment and develop skills for identifying policy relevant research questions.

## II. Course Contents

## Unit- 1: Indian Economy after independence: The legacies and strategies

- $\Rightarrow$  Characteristics of a developing economy
- Indian Economy under colonial rule
  - Commercialization of Indian agriculture
  - Comparative advantage of Indian industry in pre-colonial period
  - De-industrialization and Trade policy

- Enduring effects of Land Tenure system
- Features of Indian economy at the time of independence
  - The challenge of Structural Transformation and Development Planning
  - Role of state in Indian Economy Five-year plans
    - Approach to Rural development: Land reforms Vs Green Revolution
    - Planning for Industry: Capital Goods vs wage goods approach
  - Occupational and output structure of Indian economy
  - Criticality of informal economy
  - Poverty, disguised unemployment and economic inequality
  - Demographic transition and its regional variation in India
  - Human Development in India: Education, health and other social indicators
  - Fiscal Federal structure of Indian economy

## Unit- 2: Perspective of India's Agricultural and Industrial Economy

- $\Rightarrow$  Importance of Agriculture in Indian economy
  - Green Revolution and its consequences: Intended and unintended
    - Trends in agriculture production and productivity after Green Revolution
    - Food Security
    - Agriculture Price Policy
    - Sources of Agricultural Finance
    - Sustainable Agricultural Growth
    - Growing Regional disparity
    - Growth interpersonal inequality
    - Net negative support to agriculture
  - Performance Industry in pre-reform period
    - Trends in India's industrial growth and productivity,
    - Small vs. large industry,
    - Public vs. private sector industries
    - Impact of licensing and import substitution policies
  - Industry in Post reform Period:
    - Impact of
      - Delicensing
      - Disinvestment and privatisation
      - Trade Liberalisation
      - Foreign exchange rate policies
    - Growth of Global Value Chains and Indian Industry
    - Infrastructure, technology bottlenecks
    - Growth of unorganised manufacturing sector
    - Regional imbalances in industrial Performance
    - Premature deindustrialization in India

## **Unit- 3: Contemporary Issues**

- ⇒ Growth and stabilisation of Indian Economy Role of fiscal and monetary policies
- o Globalisation and exposure to adverse shocks
  - Globalisation in history
  - COVID and Indian economy: Monetary and Fiscal instruments

- Global Financial crisis 2007-08 and Indian economy.
- External Sector Policies:
  - Trade Policy
  - Exchange rate policy
  - Investment and capital convertibility policies
  - Sustainable Development Goals and Human Development
    - Correspondence between economic growth and development outcomes
    - Regional disparity in human and social development
    - Achievements in Education and Public Health & Nutrition
- Implications of AI on Productivity and Employment

## V. References

 $\cap$ 

- 1. Acemoglu, D., & Robinson, J. (2021). Why nations fail. *The Origins of Power, Prosperity, and Poverty.*
- 2. Acharya, S. (2002), *India: Crisis, Reforms and Growth in the Nineties*, Working Paper No. 139, Centre for Research on Economic Development and Policy Reform, Stanford University.
- 3. Ahluwalia, I. J., & Little, I. M. D. (2012). *India's Economic Reforms and Development: Essays for Manmohan Singh*. Oxford University Press. Second Edition.
- 4. Arezki, R., & Sen, P. (2025). Solving India's Industrialization Puzzle. Project Syndicate.
- 5. Banerjee, A., & Iyer, L. (2005). History, institutions, and economic performance: The legacy of colonial land tenure systems in India. *American economic review*, 95(4), 1190-1213.
- 6. Bansil, P.C, (1975) *Agricultural Problems of India*, Vikas Publishing House Pvt. Ltd.
- 7. Basu, S.C. and Gulati, A. (2005), *Economic Reforms and Food Security: The Impact of Trade and Technology in South Asia*, Routledge.
- 8. Bhagwati, J.N.(1993), *India in Transition: Freeing the Economy*, Clarendon Oxford.
- 9. Bhalla, G.S. and Singh, G. (2001), *Indian Agriculture: Four Decades of Development*, Sage Publications.
- 10. Broadberry, S., & Gupta, B. (2009). Lancashire, India, and shifting competitive advantage in cotton textiles, 1700–1850: The neglected role of factor prices. *The Economic History Review*, 62(2), 279-305.
- 11. Datt, R. and Sundharam, K.P.M, (2024) *Indian Economy*, S. Chand & Company Ltd, New Delhi. 73<sup>rd</sup> Edition.
- 12. Glinskaya, E. and Lokshin, M. (2005), *Wage Differentials Between The Public* And Private Sectors in India, The World Bank.
- 13. Gulati, A., & Sharma, A. (1995). Subsidy Syndrome in Indian Agriculture. Economic and Political Weekly, A93-A102.
- 14. Gulati, A., & Narayanan, S. (2003). The Subsidy Syndrome in Indian Agriculture. *OUP Catalogue*.
- 15. Kapila, U. (2024-25), *Indian Economy Since Independence*, Academic Foundation, New Delhi. 35<sup>th</sup> Edition
- 16. Mattoo, A. and Stern, R.M. (2003), India and the WTO, World Bank Publication.
- 17. Mohan, T.T.R. (2005), *Privatisation in India: Challenging Economic Orthodoxy*, Routledge.

- 18. Mookherjee, D. (1997), *Indian Industry: Policies and Performance*, Oxford University Press.
- 19. Rao, C.H.H. (2005), Agriculture, Food Security, Poverty and Environment: Essays on post-reforms India, Oxford University Press.
- 20. Sengupta, D., Chakraborty, D. and Banerjee, P. (2006), *Beyond the Transition of* WTO: An Indian Perspective on Emerging Issues, Academic Foundation.
- 21. Varshney, A. (1998). Democracy, Development, and the Countryside: Urbanrural Struggles in India. Cambridge University Press, Chapter 2.

## **Course: Statistical Methods for Economics**

Type of Course: Minor

**Code:** 24-ECO-M-253

Semester: IV

Credits: 4

## I. Introduction to the Course

This course is designed for students who do not have an economics background but need statistical skills for their respective disciplines. The focus is on practical applications rather than complex mathematical theories, ensuring that students can confidently apply statistical techniques to real-world problems. Throughout the course, students will learn how to describe and visualize data, understand probability concepts, conduct hypothesis testing, and use regression analysis to identify relationships between variables.

## **II.** Course Objectives

- To enhance statistical skills essential to understand data.
- To identify, solve and interpret the economic results statistically.
- To understand statistical models.

## III. Learning Outcomes

At the end of the course, students are expected,

- Able to create graphs and interpret graphical functions.
- Demonstrate the use of statistical methods in data analysis.
- Build simple statistical models.

## **IV. Course Contents**

## **Unit-1: Descriptive Statistics and Data Summarization**

- Definition and Role of Statistics; Types of Data-Quantitative, Qualitative, Scales of Measurement- Nominal, Ordinal, Interval, Ratio.
- Measures central tendency: Median, Mode, Mean, Harmonic Mean, Geometric Mean, simple and weighted averages, group averages.
- Measures of dispersion: Range, Variance and Standard Deviation, Mean Deviation, Quartile Deviation, Measures of Skewness and kurtosis; Measures of economic inequality.
- Graphic Presentation of Data: Bar Plot, Pie Chart, Histogram, Density Plot, Box Plot, Scatter Diagram, Stem-and-leaf Chart, Cross-tabulation.

## **Unit-2: Probability, Distributions, and Inferential Statistics**

- Random experiment, sample space and events
- Classical, empirical and axiomatic definitions of probability; addition and multiplication theorems
- o Conditional probability, independent events and Baye's rule
- o Binomial, Poisson and Normal distributions

## **Unit-3: Correlation, Regression and Time series Analysis**

- Correlation, Types of correlation, correlation versus causation, difference between covariance, correlation and regression, coefficient of correlation, rank correlation
- Simple linear regression; method of least squares; prediction and interpretation
- Time Series Analysis: Concept and uses; Components of time series; Methods of moving averages and least squares.

- 1. Allen, R.G.D. (1949). *Statistics for Economists*. Hutchinson's University Library, London, UK.
- 2. Agresti, A. (2018). Statistical Methods for the Social Sciences. Pearson.
- 3. Carlson, K. A., & Winquist, J. R. (2017). An Introduction to Statistics: An Active Learning Approach. Sage Publications.
- 4. Chou, Y. (1975). *Statistical Analysis*. Holt, Reinhart and Winston, New York.
- 5. Croxton, Crowden and Klein. (1971). *Applied General Statistics*, Prentice Hall of India, New Delhi.
- 6. Croxton, F.E., D.J. Cowden & S. Klein (1973). *Applied General Statistics*. Prentice Hall, New Delhi.
- 7. D. G. Rees. (1987). *Foundation of Statistics*. Chapman & Hall.
- 8. D. Gujrati. (2002). *Basic Econometrics*, (4<sup>th</sup> Ed). Mcgraw-Hill/Irwin.
- 9. F. Daly, D. J. Hand, M. C. Jones, A. D. Lunn, K. J. Mcconway. (1995). *Elements of Statistics*. Addison-Wesley.
- 10. G. M. Clarke and D. Cooke. (1992). *A Basic Course in Statistics*, (3<sup>rd</sup> Ed). Arnold.
- 11. Gupta, S.C. & Kapoor, V.K. (1988). *Elements of Mathematical Statistics*. S. Chand & Sons, New Delhi.
- 12. Hogg, R. V. and A. T. Craig. (1970). *Introduction to Mathematical Statistics* (3<sup>rd</sup> Ed). Macmillan Publishing Co., New York.
- 13. Hogg, R.V. and Craig, A.T. (1995). *Introduction To Mathematical Statistics*. Prentice-Hall International, inc. Engle Wod Cliff, N.J.
- 14. Hogg, R.V. and Tanis E.A. (1993). *Probability and Statistical inference*, (4<sup>th</sup> Ed). Macmillan Publishing Company, New York.
- 15. J. A. Rice (1995). *Mathematical Statistics and Data Analysis*, (2<sup>nd</sup> Ed). Duxbury Press.
- 16. J. E. Freund and R. E. Walpole. (1987). *Mathematical Statistics*, (5<sup>th</sup> Ed). Prentice-Hall inc.
- 17. J. E. Freund. (1999). *Mathematical Statistics*, (5<sup>th</sup> Ed). Prentice-Hall International.
- 18. Kapur, J.N. & Saxena, H.C. (1988). *Elements of Mathematical Statistics*. S. Chand & Sons, New Delhi.

- 19. Lind, Douglas A., William G. Marchal, & Samuel A. Wathan. (2006). *Business Statistics for Business & Economics*, (5<sup>th</sup> Ed). Boston: McGraw-Hill Irwin.
- 20. Millar, J. (1996). *Statistics For Advanced Level*. Cambridge University Press, Cambridge.
- 21. Mood, A.M. Graybill, F.A. and Boes, D.C. (1974). *Introduction to the Theory of Statistics*, (3<sup>rd</sup> Ed). Mcgraw-Hill Book Company, New York.
- 22. Nagar, A.L. & R.K. Das. (1983). *Basic Statistics*. Oxford University Press, New Delhi.
- 23. P.H. Karmel and M. Polasek. (1978). *Applied Statistics for Economists*, (4<sup>th</sup> Ed). Pitman, Australia.
- 24. R. L. Schaeffer. (1990). Introduction to Probability and its Applications. Pws-Kent.
- 25. S. C. Gupta. (1993). *Fundamentals of Applied Statistics*, S. Chand and Sons, New Delhi.
- 26. S. Ross. (1976). A First Course in Probability. Macmillan.
- 27. Sukhatme, P. V. and B. V. Sukhatme (1970). *Sampling Theory of Survey With Applications*. Lowa State University Press, Ames.

## **Course: Health Economics**

**Type of Course:** Ability Enhancement Course (AEC) Semester: IV

Code: 24-ECO-A-254 Credits: 2

## I. Introduction to the Course

This course provides a foundational understanding of Health Economics. In addition to equipping participants with underlying micro foundations for understating of health services, the course also attempts to provide a systems perspective on health and health care. It also showcases the student about the Indian Health system and its financing with international comparison.

## **II.** Course Objectives

- Students will be exposed to the importance of the theoretical aspect of public • intervention for health and health care.
- It will equip students with handling micro and macro data on health and relate it with policy initiatives.
- Students will be exposed to working of the health system in India in a • comparative framework with cross country comparison.

## **III. Learning Outcomes**

- Development of critical thinking about policy choices, pre existing arguments and relevance of empirical evidence on health.
- Students will be able to apply their analytical and empirical skills on different topics of health to communicate health information in a concise and clear manner.
- Students will be able to develop skills for identifying policy relevant research • questions.

## **IV. Course Contents**

## **Unit-1: Introduction to Health Economics**

• Role of health in human development: Health outcomes and their relationship with macroeconomic performance. Economics of Health vs Economics of healthcare

- Micro foundations of Health Economics: Externalities, information asymmetry, and public goods in the context of healthcare. Market Failure and Arrow's Perspective on Healthcare
- Micro and Macro Data in Health: Indicators and their Sources. Morbidity, Mortality: Birth Rate, Fertility Rate, Death Rate, IMR, CMR, MMR, Morbidity Rate (acute and Chronic),
- Child nutrition Indicators: height for Age (tunting), weight for height (Wasting), Weight for age (underweight), Adult Nutrition Indicators: BMI, Anemia

## Unit- 2: Demand and Supply of Health Care

- Demand for Health: Health in utility function, Demand for health care, Measuring price sensitivity with elasticities, The Grossman model and health disparities,
- Supply of Health
  - Physicians as providers of health,
  - Supply induced demand,
- Universal Health Coverage:
  - Direct public provision vs social insurance models,
  - Role of not for profit providers of health.
- Social determinants of public health.
- Public health perspective
  - Relative emphasis of primary, secondary and tertiary components (or promotive, preventive and curative care).
- Equity and efficiency of health system.

## **Unit- 3: Health Policy & Financing**

- Health expenditure (Public & Private): lessons from international comparisons,
- Role of WHO
- Indian Health System: organization and governance, reforms, status, debate around Fiscal federal arrangements and future challenges.

- 1. Bhattacharya, J., Hyde, T., & Tu, P. (2014). *Health economics*. Bloomsbury Publishing.
- 2. Chapter 12 [Page 409-430]: Making Competition in health care work in Porter, M. E. (2008). *On competition*. Harvard Business Press.
- 3. Chapter 6: India's Health Care Crisis in Drèze, J., & Sen, A. (2013). *An uncertain glory: India and its contradictions*. Princeton University Press.
- 4. J.W. Hinderson (2009) Health Economics and Policy, Thomson Learning
- 5. McPake, B., Normand, C., Smith, S., & Nolan, A. (2020). *Health Economics: An International Perspective*. Routledge.
- 6. Musgrove, P. (1996). *Public and Private roles in Health* (Vol. 339). Washington, DC: World Bank.
- 7. Olsen, J. A. (2017). *Principles in Health Economics and Policy*. Oxford University Press.
- 8. Selvaraj, S., Karan, A. K., Srivastava, S., Bhan, N., & Mukhopadhyay, I. (2022). India Health System Review.
- 9. Sen, A. (2002). Why health equity?. *Health Economics*, 11(8), 659-666.
- 10. Teisberg, E. O., Porter, M. E., & Brown, G. B. (1994). Making competition in health care work. *Harvard Business Review*, 72(4), 131-141. Chapter 4
- 11. V. Raman Kutty (2007), A Premier of Health System Economics, Allied Publications, New Delhi.

## **Course: Energy Economics**

**Type of Course:** Value Added Course (VAC)

Code: 24-ECO-V-255

#### Semester: IV

Credits: 2

## I. Introduction to the Course

"Ensure access to affordable, reliable, sustainable and modern energy for all" by 2030 states SDG 7. Energy is central to the functioning of economic systems. Use of substantial amounts of fossil fuel has resulted in temperature at the global level. Transitioning from exhaustible to renewable sources involves substantial economic and social costs. To incentivize such a transition various economic instruments are useful. Energy policies are useful for this purpose.

This course covers these elements, at an introductory level. No prior knowledge is necessary.

## **II.** Course Objectives

- To *understand* the importance of energy in functioning of economic systems
- To *appreciate* the functioning of energy markers
- To *understand* the role of energy policy

## **III. Learning Outcomes**

At the end of the course, the students are expected,

- To be able to *identify* the role that economic viability plays in supply of different types of energy
- To *recognize* the scope and limitations of energy markets in achieving SDG 7
- To *analyse* the role that economic instruments play in operationalising energy policy

## **IV. Course Contents**

## **Unit-1: Introduction**

- Conceptual matters: energy efficiency, energy intensity, Jevon's paradox (rate and scale), energy accounting, energy balance, energy quality, entropy, energy security
- Economy- energy linkages
- o Energy and development: energy-mix and energy ladder
- Progress towards reaching SD Goal 7, and associated targets and indicators international and national across states (NITI SDG India Index)

## **Unit-2: Energy market**

- Economic viability and social aspects of harvesting energy from different sources: solar panels and battery storage, large hydropower, bioenergy, nuclear energy, coal, petrol, diesel
- Energy demand: analysis of uses and users, forecasting and management
- Energy supply: economic viability of investments, various costs of harvesting energy, and delivery to the final consumer including transmission and distribution
- Energy pricing

## **Unit- 3: Energy policy**

- o Global agreements to address GHG emissions and global warming
- Policies for 'just' energy transition
- o Institutional framework governing energy in India
- Draft New Energy Policy (2017) of NITI Aayog

- 1. Mohammad Younus Bhat, Hiranmoy Roy, M. S. Bhatt, eds. (2020) *Energy Economics and the Environment: Conservation, Preservation and Sustainability.* Sage. (Text)
- 2. NITI Aayog (2024) SDG India Index 2023-24. New Delhi. https://www.niti.gov.in/sites/default/files/2024-07/SDG India Index 2023-24.pdf
- 3. Ramprasad Sengupta (2013) 'Chapter 12: Energy' and 'Chapter 14: Global Warming and Climate Change' in *Ecological Limits and Economic Development*. OUP. (Text)
- 4. Subhes C. Bhattacharyya (2011) Energy Economics: Concepts, Issues, Markets and Governance. Springer. (Text)
- 5. Vaclav Smil (2017) Energy: A Beginner's Guide (Beginner's Guides). Oneworld Publications.