Parvatibai Chowgule College of Arts and Science
(**Autonomous**)

DEPARTMENT OF ECONOMICS

SYLLABUS FOR SEMESTER I, III, V

Academic year 2025-26

COURSE STRUCTURE

SEMESTER	MAJOR CORE	MINOR/ VOCATIONAL	MULTIDISCIPLINARY COURSE (MDC)	VALUE ADDED COURSES (VAC)	SKILL ENHANCEMENT COURSE(SEC)
I	**UG-ECO-101:** Microeconomics-I	**UG-ECO-102:** Principles of Economics	**UG-ECO-MDC1**: Financial Investment for all **UG-ECO-MDC2**: Natural Resource Economics	**UG-ECO-VAC1**: Kautilya's Arthshashtra **UG-ECO-VAC2:** Financial Literacy	**UG-ECO-SEC1:** Accounting for Non-accountants
III	**UG-ECO-201:** Macro Economics- I	**UG-ECO-203:** Economics of social Sector	**UG-ECO-MDC4:** Human Resource Management		**UG-ECO-SEC4:** Actuarial Economics
	UG-ECO-202: Empirical Techniques for Economic Analysis – I		**UG-ECO-MDC5:** Transport Economics		**UG-ECO-SEC6:** DATA MANAGEMENT & PRESENTATION USING MICROSOFT EXCEL
V	**UG-ECO-301**: Research Methodology in Economics	**UG-ECO-304**: Introduction to Operations Research for Economists			
	UG-ECO-302: Statistical Methods in Economics				
	UG-ECO-303: Introduction to Econometrics				
	UG-ECO-PRJ Project				

Semester I
DISCIPLINE-SPECIFIC CORE COURSE

Course Title: Microeconomics
Course Code: UG-ECO-101
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives

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

Course Learning Outcomes

Upon completion of the course, the student will be able to:

CLO1: Analyse consumer decision-making by differentiating between cardinal and ordinal utility theories.
CLO2: Evaluate the production process using the production function, isoquants, and cost functions
CLO3: Compute total, average & marginal concepts related to production, cost & revenue.
CLO4: Compare & contrast competitive & non-competitive market structures.

Course Content

Module I: Consumer Behavior and Demand **(15 Hours)**
Distinction between Cardinal and Ordinal Utility, Law of Utility, Indifference Curves, Budget Line, Substitution Effect and Income Effect; Hicksian and Slutsky's Analysis; Derivation of the demand curve and Engel's Curve, Revealed preference theory.

Module II: Production **(15 Hours)**
Production function – AP and MP, Non-linear production function, Production with one variable input, Production with two variable inputs, Isoquants – MRTS-elasticity of factor substitution, so-cost line - Ridge Line, Returns to Scale.

Module III: Cost and Revenue **(15 Hours)**
Cost of Production, Behavior of cost, Short run and Long run Costs, Derivation of Average and marginal cost curves, Least cost input Combination, Introduction to Modern Cost Curves: L- shaped and inverted J- shaped cost curves, Concepts of revenue: AR, MR, TR, Break-even analysis.

Module IV: Perfect and Imperfect market structure (15 Hours)

Perfect markets, Behavior of profit-maximising firms and the production process; Price and output decisions; costs and output in the short and long run;

Nature and types of imperfect market structures, Assumptions, Conditions of imperfections, Imperfect markets: price & output under Monopoly, Monopolistic competition and Oligopoly.

List of books recommended for reference

Mandatory Reading

1. Salvatore, Dominick, Principles of Microeconomics,(Eighth Edition) Oxford International student edition,

2. Pindyck, Robert S and Rubinfeld, Daniel L. (2012). Microeconomics. Pearson, Delhi

3. Tucker,I. *Economics for Today ,*(Eleventh edition), Cengage learning , Inc

Supplementary Reading

1. Hubbard, R. G. and O'Brien, A. P. (2012), Microeconomics, Pearson, Delhi.

2. O'Sullivan, A., Sheffrin, S. M. and Perez, S. J. (2012). Microeconomics, Principle,

   Application and tools, Pearson, Delhi.

3. Koutsoyannis, A, Modern MicroEconomics (Second Edition), Palgrave Macmillan

Online resources:

1. https://www.researchgate.net/publication/276345195_Indifference_Curve_Analysis_The_Correct_and_the_Incorrect/link/584de00008ae4bc8993312cd/download

2. https://economics.ucsc.edu/research/downloads/Friedman-Sakovics-MU23.pdf

3. http://etheses.lse.ac.uk/3053/1/U616008.pdf

4. http://www.oecd.org/daf/competition/1920526.pdf

Course Title: Principles of Economics (MINOR)
Course Code: UG ECO 103
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:
This minor course in economics aims to introduce the fundamental concepts and tools necessary to understand the economic decision-making of market participants such as individual households, firms, and the government. The course coverage primarily encompasses the two major areas of economics, namely Microeconomics and Macroeconomics.

Course Learning Outcomes:
Upon completion of the course, the student will be able to:
CLO1: Define the basic concepts of economics and identify economic problems that require decision-making.
CLO2: Explain how supply and demand affect market prices and quantities.
CLO3: Arrange different market structures based on the degree of competition.
CLO4: Understand the macroeconomic concepts related to national income.

Course Content:

Module I: Thinking Like an Economist and Basic Principles of Economics (15 Hours)
Decision making, functioning of an economy, normative and positive economics, circular flow diagram; production possibility frontier.

Module II: Demand, Supply and Market Equilibrium (15 Hours)
Law of demand, Law of supply; Factors affecting demand and supply; market equilibrium; elasticity of demand and elasticity of supply; consumers' surplus and producers' surplus.

Module III: Market Structure (15 Hours)
Firms and markets: perfect competition, monopoly (Bilateral Monopoly), Monopolistic competition, oligopoly.

Module IV: Macroeconomic Concepts and Policies (15 Hours)
Concepts of National income, Unemployment and inflation: Concepts and Causes; Growth and stabilisation objectives; Introduction to Fiscal and Monetary Policy measures.

List of books recommended for reference.
Mandatory reading:
1. Mankiw, N. G. (2016). *Principles of microeconomics* (8th ed.). CENGAGE Learning Custom Publishing.
2. Dominick, S. (2012). *Principles of Microeconomics* (8th ed.). Oxford International Student edition.

Supplementary reading:

1. Tucker, I. (2005). *Economics for Today*. Cengage Learning, Inc.
2. Pindyck, R. S. (2012). *Microeconomics*. Pearson Delhi.

Online Resources:

1. **https://s.docworkspace.com/d/AHKfZ6DYjI4uwfvQ_JOdFA**
2. **https://www.google.com/url?sa=t&source=web&rct=j&url=https://mpra.ub.uni-mu
enchen.de/390/1/MPRA_paper_390.pdf&ved=2ahUKEwjFzsWugcHkAhUfTY8KH
UQaABYQFjAPegQIBxAB&usg=AOvVaw2GV4rf2L5axBFyI3HuAu3J**
3. **https://mpra.ub.uni-muenchen.de/390/1/MPRA_paper_390.pdf**
4. **https://econpapers.repec.org/bookchap/eeelabchp/5-11.htm**

Course Title: Financial Investment for All
Course code: UG-ECO-MDC1
Credits: 3
Marks: 75
Duration: 45 hours

Prerequisite Courses: (NIL)

Course Objectives

This is an introductory course on the fundamentals of investments. This course covers topics such as financial Markets, corporate and government securities, financial intermediaries, mutual funds, security markets, stock and bond valuations, security analysis, and derivatives. The objective of the course is to provide students with a basic understanding of various investment alternatives and how to value those investments.

Course Learning Outcomes

Upon completion of the course, the student will be able to:

CLO1: Analyze components of the financial system.

CLO2: Apply time value of money concepts to calculate present and future values, EMI, and interest rate effects, and evaluate recent changes in the Indian banking sector.

CLO3: Apply the theoretical concepts to the actual working of the financial markets

Course Content

Module I: Introduction to the financial system   **(15 Hours)**

Meaning; financial system: an overview, flow of funds, financial institutions, financial markets, financial instruments, financial services, regulators; Primary markets: types of issues, public issues: IPO-FPO, right issues; Bonus issue: private placement, preferential allotment, qualified institutions placement, documents, prospectus, letter of offer, placement document; Types of financial markets: security markets, money markets, foreign exchange markets, commodity markets, insurance market; Differences between investing in low risk vs. high risk instruments.

Module II: The Banking System: **(15 Hours)**

Time value of money: present and future value,***c**alculation; Importance of a banking system; Bank deposits as a low-risk asset class; Types of bank deposits; Bank loans; types of loan instruments; interest rate spread**; ***EMI calculations; other facilities provided by the banks; Effects of interest rates on the banking system; Role of a central bank as a regulator of the banking system; Cryptography & cryptocurrencies: Bitcoin's; Recent changes in the banking sector in India.

Module III: Stock Market and Mutual Funds   **(15 Hours)**

Meaning of a stock market Index: Sensex, Nifty; Stock market indicators: fundamental and technical analysis market capitalization, turnover, turnover ratio, market capitalization ratio trade value ratio; Types of financial derivatives; Meaning and types of mutual funds: Systematic Investment Plans, benefits of investing in mutual funds, tax benefits on selected mutual fund investments, types of mutual fund schemes, *****Calculation of NAV, *****Steps in the creation of an initial investment Portfolio.

List of books recommended for reference

Mandatory Reading

1. Chandra. P. (2021)*, Investment Analysis and Portfolio Management,* Tata McGraw-Hill, New Delhi

2. Khan M. Y.; Jain P. K. (2015), *Financial Management*, Tata McGraw-Hill Publishing, New Delhi.

Supplementary Readings

1. Graham, B. (2008), *The Intelligent Investor*, Harper

2. Siegel, Jeremy J. (1998) *Stocks for the Long Run*, McGraw-Hill. New York

3. L.M. Bhole (3rd Edition, 2002): Financial Institutions and Markets, Tata McGraw Hill, Delhi.

Online resources

1. Bombay Stock Exchange https://www.bseindia.com/

2. National Stock Exchange https://www.nseindia.com/

3. Security and Exchange Board of India https://www.sebi.gov.in/

4. https://economictimes.indiatimes.com

Course Title: Natural Resource Economics
Course Code: UG-ECO-MDC2
Credits: 03
Marks: 75
Duration: 45 hours

Prerequisite Courses: (NIL)

Course Objectives: This course covers the role of economics in decisions that affect natural resources and the environment. The overall objective of this course is to provide students with conceptual insight, problem-solving skills, and general knowledge needed to better analyze and solve natural resource and environmental issues and problems from an economic perspective which recognizes the important linkages between economic, environmental, and ethical systems.

Course Learning Outcomes: Upon completion of this course students will be able to

CLO1: Examine economic concepts to issues that involve the sustainable use of natural resources
CLO2: Apply key themes, principles, terminology, and relevant economic theory to real-world problems.
CLO3: Analyze, from an economic perspective, the relevance of resource use, allocation, and policy to public decision-makers, as well as private individuals and firms.

Course content

Module I: Issues in Natural Resource Economics & Visions of the Future   **(15 Hours)**

The Economic Approach to Natural Resources; Normative Criteria for decision making; the optimal outcome; Microeconomic Concepts Applied to Natural Resources; Resource Supply and Scarcity; Economic efficiency and risk.

Module II: Criteria for Natural Resource Policy   **(15 Hours)**

Introduction to Natural Resource Policy: Property Rights, Externalities and Natural Resource Problems, Market failures; Institutional framework; Valuation of Natural Resources: Types of values; issues in benefit estimation; discounting, Benefit-cost analysis, Non-market valuation; Economics of Non-renewable resources; Optimal rate of extraction; Hoteling's rule.

Module III: Economics of Forestry, Fisheries and Wildlife and Sustainable Development
    (15 Hours)

Forestry: The maximum sustained yield; the single rotation, and the multiple rotations.

Fisheries and wildlife: The yield effort-function; the static model of open access and efficient harvest; population growth & open access-hunting; Sustainability; ethics; institutional response, Collective action, Civic society movement.

List of books recommended for reference

Mandatory Reading

Tietenberg t. and   Lewis L.(2020) , Environment and Natural Resource Economics, Taylor and Francis

 Supplementary Reading:

1. Conrad John and Clark Colin (2012) Natural resource economics: Notes and problems, Cambridge University Press

2. Field Berry (2015) , Natural resource Economics (Third Edition), Waveland Press

3. Harris J and Roach B.(2013) Environmental and natural resource economics: contemporary approach(third edition), M.E. Sharpe Inc

4. Neher P. (1990) Natural resource economics: conservation and exploitation Cambridge University Press

5. Pearce D and Turner R., (1990) Economics of Natural Resource and Environment, John Hopkins university press

 Online Resources

1. Natural resource economics under rule of hotelling:https://onlinelibrary.wiley.com/doi/full/10.1111/j.13652966.2007.00441.x?casa_token=f9d62DXf8fgAAAAA%3AiqZWLpENZUDZcbaRRU_eSwT8uWTSjpX_9WT0ZYnosVYT29Irpw6cHlrg7Xgyy5QR53Q_mDlT4XJG7Pg

2. Natural resource economics

 http://users.accesscomm.ca/hramsey/econ832/Material/HartwickOlewiler1986-TOC-Ch3.pdf

3. Economics of natural resource availabilityhttps://onlinelibrary.wiley.com/doi/abs/10.1111/14676419.00112?casa_token=1eEnZINgGAAAAAA:dTeQU7wnUDusGiIVG6MoQF0R0XT_mQBWpEePSgR7mSOHOq5uNGovgEM5SReAwye8ZkqS1itvm8bqWS

4. Property rights https://onlinelibrary.wiley.com/doi/full/10.1111/j.1467-8489.2004.00257.x

5. Natural resource economics and economic growth https://www.nber.org/papers/w5398

<h1 style="text-align: center;"><u>SKILL ENHANCEMENT COURSE (SEC)</u></h1>

Course Title: Accounting for Non-accountants
Course code: UG-ECO-SEC1
Credits: 3
Marks: 75
Duration: 45 Hours

Prerequisite Courses: (NIL)

Course Objectives
The key objective of this course is to provide the students an exposure to the accounting discipline and help them to understand the language of accounting. There are a number of sub-disciplines that fall under the umbrella of "accounting," but in this course, we will be focused on a few basic disciplines of accounting. This course introduces you to financial, cost, and management accounting in preparation for more advanced business topics within the business major. In this course, the formats of focus will be identified as the Income Statement, the Balance Sheet, the Statement of Cash Flows, and the Statement of Shareholders' Equity. In this course, you will learn how to compile and analyze these financial statements, determine the value of a firm, and compare the firm to its competitors.

Course Learning Outcomes

Upon completion of the course, the student will be able to:

CLO1: Identify the concept of Financial, Cost, and Management accounting
CLO2: Develop the understanding and skills to prepare accounts of the corporate and banking sector**.**
CO3: Explain the basics of accounting, preparation of various accounts via Tally ERP software.

Course Content

Module I: The Accounting Process   (15 Hours)

Theoretical Framework of Accounting; Generally Accepted Accounting Principles, Concepts and Conventions; Capital and Revenue transactions: capital and revenue expenditures, capital and revenue receipts; Measurement, Valuation, and Accounting estimates; Double entry system, Books of prime entry, Subsidiary Books; Recording of Cash and Bank transactions; Preparation of Ledger Accounts; Preparation of Trial Balance: interpretation and usefulness; Rectification of Errors; Type of entries: Opening entries, Transfer entries, Adjustment entries, Closing entries.

Module II: *Issues in Accounting   (15 Hours)

Creating new ledgers/Company; Reconciliation Statements and Accounting for Depreciation: definition and causes of depreciation, need for depreciation, methods of calculating the amount of depreciation: straight-line method, diminishing balance method; Bank Reconciliation Statement; Receivables / Payables Reconciliation Statement; Stock Reconciliation Statement.

Module III:* Preparation of Final Accounts   **(15 Hours)**

Profit making concern: (for sole proprietorship concern and partnership firm only): Preparation of Trading Account, Profit & Loss Account, and Balance Sheet; Accounting treatment of bad debts; Reserve for bad and doubtful debts; Provision for discount on debtors and provision for discount on creditors; Not-for-Profit making concern: Preparation of Receipts and Payments Account; Preparation of Income and Expenditure Account; Preparation of Balance Sheet.

*Practical component to be taught using accounting software Tally ERP 9.

List of books recommended for reference

Mandatory reading:
1. Kansal, Amit (2014), NCERT solutions Accountancy, Arihant, Meerut
2. T.S. Reddy & A. Murthy (2011), Financial Accounting, Margham Publications, Sixth Revision Edition.

Supplementary Reading:
1.P.C. Tulsian (2003), Financial Accounting, Tata MC Graw Hill Ltd.
2. Manosh Dutta (2010), "Cost Accounting', Dorling Kindersley (India) Pvt. Ltd.
3. T.S. Reddy & Y. Hari Prasad Reddy,(2014)"Cost Accounting", Margham Publications.
4. Gibson, Charles H. (2013), Financial Statement Analysis, Cengage Learning, Delhi.
5. Singal, Santosh (2012), Accounting and Financial Analysis, International Book House, New Delhi.
6. M.C. Shukla, T.S. Grewal, Dr. M. P. Gupta (2010) CostAccounting,S.Chand & Company Ltd.

Online Resources:
   1. Depreciation- Depreciation Methods: Check Formula, Factors & Types

   2. Accounting Principles- Accounting Principles, Accounting Conventions and Concepts

VALUE-ADDED COURSES (VAC)

Course Title: Kautilya's Arthashastra
Course Code: UG-ECO-VAC1
Credits: 2
Marks: 50
Duration: 30 Hours

Prerequisite Courses: (Nil)

Course Objectives
The main objective of this course is to give ideas to students about the Political and economic ideas of Chanakya. Kautilya's Arthashastra provides a valuable basis for the economy. It contains useful insights into economics.

Course Learning Outcomes
Upon completion of this course, students will be able to

CLO1: Assess Kautilya's economic ideas and their relevance to contemporary economic practices**.**
CLO2: Analyze the concept of the welfare state and Kautilya's views on public finance and international trade, comparing them with modern economic practices.

Course Content

Module I: Introduction to Kautilya's Arthshastra   **(15 Hours)**
Introduction to Kautilya's Arthshastra; Economic ideas of Wealth, Views on Consumption and Production, Concept of 'Varta', Importance of Agriculture and Animal Husbandry, Value of Labour, Significance of Trade, Views on Population, Slavery; Relevance and application of Arthshastra to contemporary economics.

Module II: Economic Policy, Public Finance and International Economics   **(15 Hours)**
Concept of Welfare State, Views on Public Finance: taxation, revenue collection, public goods provision, Ideas about Town Planning and Social Security, right to Private Property, Justification of Interest; International trade and diplomacy with neighbouring countries.

List of books recommended for reference

Mandatory Reading

1. Singha Roy, S. (2018). Kautilya's' Arthashastra 'and Modern Economics, available at SSRN

2. Rangarajan, L. N. (Ed.). (1992). *The Arthashastra*. Penguin Books India.

Supplementary Reading

1. Waldauer, C., Zahka, W. J., & Pal, S. (1996). Kautilya's Arthashastra: A neglected precursor to classical economics. *Indian Economic Review*, 101-108.
2. Chousalkar, A. S. (2004). Methodology of Kautilya's Arthashastra. *The Indian Journal of Political Science*, 55-76.
3. Sihag, B. S. (2005). Kautilya on ethics and economics. *Humanomics*, *21*(3), 1-28.
4. Manrai, R., & Goel, U. (2017). Sustainable economic governance: learning from Kautilya's Arthashastra. *International Journal of Indian Culture and Business Management*, *15*(2), 241-253.
5. Sihag, B. S. (2013). Kautilya's Arthashastra: The Origin of Statistical Economics during-4CE. *Journal of Rajasthan Statistical Association*, *2*, 1-14.

Online Resources

1. Kautilya'sArthashastra https://libarch.nmu.org.ua/bitstream/handle/GenofondUA/19273/f2c8936431b9587a3448e1b3d8eff8e8.pdf?sequence=1

2. The missing link: From Kautilya's The Arthashastra to modern economics https://www.ceeol.com/search/article-detail?id=764196

3. Kautilya's Arthashastra: A Recognizable Source of the Wealth of Nationshttps://www.scirp.org/journal/paperinformation.aspx?paperid=63343

4. Kautilyan Economics: An Analysis and Interpretation https://journals.sagepub.com/doi/abs/10.1177/0019466220000408?journalCode=ieja

Course Title: Financial Literacy
Course Code: UG-ECO-VAC2
Credits: 2
Marks: 50
Duration: 30 hours

Prerequisite Courses :(Nil)

Course Objectives

The objective of this course is to inculcate financial literacy concepts among college-going students through financial education to make it an important life skill. The course also aims to encourage active savings behaviour, encourage participation in financial markets to meet financial goals and objectives, develop credit discipline and encourage availing credit from formal financial institutions as per requirement.

Course Learning Outcome
Upon completion of this course, students will be able to

CLO1: Recognise the need for Financial Literacy and planning
CLO2: Explain the role of financial education to achieve financial well-being

Course Content

Module I: Financial Literacy and Planning **(15 Hours)**
Financial Literacy: Meaning, Need; Role of financial education in achieving financial well-being; Key concepts of Personal Finance: Savings, Investment, Borrowing, Income and Expenses, Surplus/ Deficit, Assets and Liabilities, Inflation, Time Value of Money, Active and Passive Income, Instant and Delayed Gratification; Financial Planning: definition, process, Importance, Steps involved in Financial Planning Process, SMART financial goals, Three pillars of investments; Concepts of risk and return, Budgeting and its importance in financial planning.

Module II: Savings, Investment, and Insurance Planning **(15 Hours)**
Savings: Types of bank accounts; Various modes of transfer through banking channels: NEFT, RTGS, IMPS, UPI; Account opening process and importance of KYC norms; Precautions to be taken while using digital payments; Credit cards and Debit cards; Banking Ombudsman, Role of Reserve Bank of India.
Investment: Investment avenues offered by Securities Markets, Various risks involved in investing in securities markets, Mutual funds, and Benefits of investing through Mutual Funds.
Insurance- Types of insurance, role of Insurance as a risk management tool, various types of Insurance products and their key features.

*Practical component on financial literacy awareness campaign for the community.

List of books recommended for reference

Mandatory Reading

1.   Chandra. P. (2014), Investment Analysis and Portfolio Management, Tata McGraw-Hill, New Delhi

2.   Khan M. Y. & Jain P. K. (2015), Financial Management, Tata McGraw-Hill Publishing, New Delhi

Supplementary Reading:

1.   Francis J C & R.W Taylor (1992), Theory and Problems of Investments, McGraw-Hill, Schaum's Outline Series, Singapore.

2.   Bodie, Zvi Kane, Alex Marcus Alan (2012), Essentials of Investments, 9th Edition, McGraw-Hill Higher Education.

Online Resources:

1.   Financial Education https://ncfe.org.in/program/fepa

2.   Investing   https://courses.varunmalhotra.co.in/learn/FLAP

3.   Financial Literacy   https://www.investopedia.com/guide-to-financial-literacy-4800530

DISCIPLINE-SPECIFIC CORE COURSE

Course Title: Macroeconomics- I
Course Code: UG-ECO-201
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:
The objective of this course is to familiarize students with pure macroeconomic theories. It offers a strong base for studying applied macroeconomic theories and principles. It also enables students to understand the process and dynamics of market-based macroeconomic decision-making.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO1: Define various key macroeconomic variables, principles & tools, and national income concepts.

CLO2: Discuss macroeconomic concepts to develop an understanding of the workings of the economy.

CLO3: Examine and analyze Keynesian and Monetarist macroeconomic frameworks.

CLO 4: Elaborate on the impact of macroeconomic policies on the state of the economy.

Course Content:

Module I: Introduction to Macroeconomics & National Income (15 hours)

Nature and scope of Macroeconomics; origin and growth of Macroeconomics limitations of macroeconomics; Definitions and Concepts of National Income, Components of National Income, Real and Nominal concepts of National Income, Methods of Measurement of National Income, and difficulties in measuring National Income.

Module II: Classical Theory of Output and Employment (15 hours)

The Classical postulates, Say's the foundation of Classical Macroeconomics, and implications of Say's Law, Criticism of the Law of Markets; Classical Theory of Employment, the principles of

effective demand and supply; Pigou's reformation of wage cuts for Full employment; Appraisal of Classical Theory of Output and Employment.

Module III: Theories of Consumption & Investment   (15 hours)

Introduction to Keynesian economics, Keynesian absolute income hypothesis, Dusenbery's relative income hypothesis, Friedman's permanent income hypothesis, Ando & Modigliani's Life-Cycle hypothesis, The Keynesian approach of the theory of investment and capital accumulation: investment decision, change in interest rate, Marginal Efficiency of Capital and Capital accumulation, the multiplier, and accelerator theory of Investment; Appraisal of Keynesian theories of Consumption and Investment

Module IV: Keynesian and Post-Keynesian Theory of Money and Interest   (15 hours)

 The Keynesian Theory of Demand for Money – The Keynesian theory of interest – changes in the Money market and the interest rate – Criticism of the Keynesian theory of interest. Portfolio theory of demand for money – Baumol-Tobin's approach to the demand for money – Friedman's quantity theory of money.

List of books recommended for reference

Mandatory Reading

1. Dornbusch, Fischer and Startz. (2010). Macroeconomics, McGraw-Hill, 11th edition.
2. Richard T Froyen Macroeconomics Theories And Policies

Supplementary Reading
1. Mankiw, N.G. (2010) *Macroeconomics,* Worth Publishers, New York.
2. Errol D' Souza. (2009). Macroeconomics, Pearson Education.
3. Samuelson, P.; Nordhaus, William (2010) *Economics*, McGraw Hill Education. Delhi

Online resources:
1. https://global.oup.com/uk/orc/busecon/economics/burda7e/
2. https://open.umn.edu/opentextbooks/textbooks/33

Course Title: Empirical Techniques for Economic Analysis – I
Course Code: UG-ECO-202
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:
The objective of this course is to provide students with a good understanding of empirical methods and their application in economics. Further, it empowers students to process the raw data by using soft techniques/tools to analyze economic phenomena conclusively. It also provides them with competency not only in their professional arena but in academics.

Course Learning Outcomes:
Upon completion of the course, the student will be able to:

CLO 1: Relate empirical methodology to an economic inquiry by summarising and interpreting data.

CLO 2: Apply discrete and continuous probability distributions to various business problems.

CLO 3: Develop basic statistical inference using correlation, regression, indices, hypothesis testing, and ANOVA.

CLO 4: Analyze statistical data using MS Excel.

Course Content:

Module I: Correlation and Regression **(15 Hours)**
> Karl Pearson's coefficient of correlation and Spearman's Rank coefficient of correlation; properties of Pearson's coefficient of correlation; Linear regression: meaning, regression equations, and lines;*Use of MS EXCEL/Other spreadsheets.

Module II: Time Series & Index Numbers **(15 Hours)**
> Definition and Utility of Time Series Analysis; Components of Time Series; Decomposition of Time Series; Methods of Measurement of Trend: freehand method, semi-averages, moving average, least squares method; Meaning and Concept of Index Numbers; Issues in Construction of Index Numbers; Classification of Index Numbers; Methods of Constructing Index Numbers: Weighted Index Numbers, Unweighted Index Numbers.

Module III: Probability Distributions **(15 Hours)**
> Meaning of probability; Fundamental Concepts and Approaches to Probability; Probability Laws: Addition Law, Multiplication Law, Applications of probability Law; Bayes' Theorem;

Types of Probability Distribution; Concept of Random Variables; Discrete Probability Distribution: Binomial Distribution, Poisson Distribution; Continuous Probability Distribution: Normal Distribution, Characteristics of Normal Distribution, Importance and Application of Normal Distribution.

Module IV: Population, Sampling, and Hypothesis Testing   (15 Hours)

Population and sampling; Need for sampling, concept of 'Good Sample'; Methods of sampling: probability and non-probability sampling; sampling techniques; Optimum sampling; Nyman's sampling: problems to be solved based on sampling methods; Hypothesis; Level of significance, critical area; Type I and Type II errors, Z, t, F and χ^2 distribution; ANOVA (one way and two ways).

*Existing or Extra lectures on the use of Excel (Mandatory)

List of books recommended for reference

Mandatory Reading

1. Gupta, S.P. 1999, Elementary Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Arora, P.N. et al. (2007), *Comprehensive Statistical Methods,*   1st edition, S. Chand, New Delhi.
3. David F. Stephan et al. (2021), Statistics for Managers Using Microsoft Excel, 9th edition. Pearson Publication
4. Wayne L. Winston(2019), Microsoft Excel 2016 Data Analysis and Business Modeling, 5th edition. Pearson Publication

Supplementary Reading

1. Anderson, David R. et.al. *Statistics for Business and Economics,* Cengage Learning India Edition.
2. Levine, D. M., Berenson, M. L., & Stephan, D. (1997). Statistics for managers using Microsoft Excel. Upper Saddle River, N.J: Prentice Hall.

Online resources:

1. https://www.itl.nist.gov/div898/handbook/prc/section1/prc131.htm
2. https://www.statisticshowto.com/probability-and-statistics/hypothesis-testing/
3. https://www.excel-easy.com/examples/descriptive-statistics.html

Course Title: Economics of Social Sector (Minor)
Course Code: UG ECO 207
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:
This course aims to enhance the understanding of the students about the role of social sectors in the process of development. The course is structured to equip them with recent discourses and new tools in the economics of education and health.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO1: Describe economic principles and concepts that apply to the social sector.
CLO2: Analyze the healthcare system, its challenges, and policies.
CLO3: Explore the economic principles and concepts in the education sector.
CLO4: Evaluate the disparity in healthcare access, resource allocation and health outcomes based on socio-economic factors.

Course Content:

Module I: Introduction to Economics of Social Sector (15 Hours)

Relevance and Application of Economics of Social Sector, Channels of Social Sector Development, Human Capital Development and Social Sectors, Introduction to the economic model of human capital; Role of different levels of government.

Module II: Health Sector in India (15 Hours)

Global burden of diseases, India's position in the world concerning Communicable and non-communicable diseases, Performance of the States, Various challenges; Poverty and Malnutrition; Environmental health problems; Various government policies, and the Impact of COVID-19 on the Indian health system; Health Outcomes, Health system, Health financing pattern.

Module III: Economics of the Education Sector and its Implications in India (15 Hours)

Cost of education: private and social cost, direct and opportunity cost, Pattern of educational finance in India; Benefits: returns to education, Mincerian returns to education, private and social benefits; Education, employment and income, Education and economic growth, New Education Policy: social and economic impact.

Module IV: Social Sector and Inequality (15 Hours)

Inequality in health spending and outcomes; Inequality in educational achievements and expenses; Linkages between income inequality, poverty, education, and health.

List of books recommended for reference: Mandatory reading:

1. Becker, G.S. (1974). *Human Capital. 2nd edition*, NBER, New York.

2. Blaug, Mark (1972). *Introduction to Economics of Education,* London: Penguin.

3. Folland, S., A.C. Goodman, and M. Stano (2001). The Economics of Health and Health Care. New Jersey: Prentice Hall.

Supplementary reading:

1. Phelps, Charles E. (2010). *Health Economics*. 4th edition, Prentice Hall.
2. Tilak, J.E.G. (1989). *Economics of Inequality in Education*. New Delhi: Sage.

Online Resources:

1. https://mnre.gov.in/

2. Government of India: Economic Survey, Recent Issue https://www.indiabudget.gov.in/economicsurvey/

3. Annual Reports of Concerned Ministries of the Government of India https://www.india.gov.in/my-government/documents/annual-report

Course Title: Human Resource Management
Course code: UG-ECO-MDC4
Credits: 3
Marks: 75
Duration: 45 hours
Prerequisite Courses: (NIL)

Course Objectives:

The objective of this course is to impart to students the knowledge, understanding, and key skills that are required by today's human resource professionals and to enable them to effectively contribute to dynamic organisations as employees.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:
CLO1: Explain the value and importance of human resources in an organisation.
CLO2: Analyze the ways and means of hiring and appraising human resources and administer and contribute to the design and evaluation of the performance management program.
CLO3: Apply knowledge through hands-on training by solving case studies that simulate real-world human resource challenges.

Course Content:

Module 1: Introduction to Human Resources Management **(15 hours)**

Human resource management (H.R.M.): Introduction, Definitions, Nature, Features, Scope, Objectives, Functions, and Principles. Global Challenges; Internal and External forces affecting the human resource function; H.R.M. department: Objectives, importance, global setting.

Module 2: Recruitment and Selection Process **(15 hours)**

Purpose, Importance, and Sources of Recruitment; Planning and Forecasting; Factors Governing Recruitment Process; Effective Recruiting Tools of Selection and Selection Process; Internal and External Sources of Candidates; Recruiting a Diverse Workforce; Employee Testing and Selection; Induction and Placement; Role of recruitment agencies, Dispute resolution and settlement mechanism.

Module 3: Practical Management Skills **(15 hours)**

Performance appraisal: Introduction, definition, objectives, need and importance; Process of Performance Appraisal; Training - Designing an Effective Training and Development Programme; Evaluation of the Effectiveness of Training Programmes; Challenges before a Trainer

*Module 3 is a Practical Component that includes: Case studies: Designing a Training Module for employees on self-development, Designing of advertisement for the post, Conducting Interviews; Designing Performance Appraisal; Dispute Settlement and Redressal

List of books recommended for reference

Mandatory Readings:

1.	Aswathappa. K. (2008), Human Resource and Personnel Management (5th edition), Tata. McGraw-Hill Publishing Company Ltd., New Delhi.

2.	Bernardin, H. J. (2007). Human Resource Management. An Experiential Approach. Tata McGraw Hill.

Supplementary Readings:

1. DeCenzo, D. A. & Robbins, S. P, (2008), Fundamentals of Human Resource Management, 8th edition, John Wiley & Sons Ltd, ISBN: 9812-53-171-8.

2. Dessler, G. (2008) Human Resource Management. Pearson Prentice Hall, Upper Saddle River.

3. Ivancevich, J. M. (2008), Human Resource Management, Tata McGraw Hill.

Online Resources:

1.	Human Resource **https://www.aihr.com/blog/human-resource-basics/**
2. Human Resource Management **https://www.managementstudyguide.com/human-resource-management.htm**
3.	Performance appraisal **https://www.managementstudyguide.com/performance-appraisal.htm**
4.	Training and Development **https://www.ibm.com/in-en/topics/training-development**
5.	**https://www.toppr.com/guides/business-management-and-entrepreneurship/human-resource-management/training-and-development/**

Course Title: Transport Economics
Course code: UG-ECO-MDC5
Credits: 3
Marks: 75
Duration: 45 hours

Prerequisite Courses: (NIL)

Course Objectives:

The objective of this course is to provide students with an understanding of the relationship between transport and the economy. The course has been designed to apply economic concepts in a practical setting and illustrate them using case studies especially chosen from the Indian context to provide important insights into the economics and management of different parts of the transport sector. The course also provides insight into the transport economy of India.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO1: Discuss and debate contested transportation economic issues,

CLO2:   Identify detailed elements of the transportation economics sub-field that may be appropriate for future thesis/project work.

CLO3:   Evaluate economic policies that affect the transportation system and understand the institutional and political barriers associated with transportation pricing and financing.

Course Content

Module I: Introduction to Transport Economics   **(15 lectures)**
Introduction: Basics of microeconomics (demand and supply, and consumer surplus);
Transport and the economy & transport and local economic development; Types of transports; Public and private transport In India, Regulation and competition in the transport sector.

Module II: Demand and supply of transport in India   **(15 lectures)**
Demand for public and private transport; supply of transport; feasibility and suitability of public transport with private ownership; Indian railways: Passenger and freight, Inland waterways in India: Freight, Vehicular density in India: Measurement; Externalities.

Module III: Sustainable Transport in India   **(15 lectures)**
Carbon footprints from transport; Issues with shared public transport; Environment-friendly modes of transport: Cycles, electric scooters, and cars; Shared environment-friendly transport: Cycles and electric scooters on rent; India's Transport policy; Technology and transport: use of GPS and GIS; Wildlife friendly transport.

List of books recommended for reference

Mandatory Readings:

The Routledge Handbook of Transport Economics Edited By Jonathan Cowie, Stephen Ison
Transport Economics, 3rd Edition 3rd Edition, Kenneth Button(2010); Edward Elgar Publication

Supplementary Readings:

1.Arnott, R., Kraus, M. (2003). Principles of Transport Economics. In: Hall, R.W. (eds) Handbook of Transportation Science. International Series in Operations Research & Management Science, vol 56. Springer, Boston, MA.

2. Immers L.H ., Stada J.E. Basics of Transport Economics (2004)

Online Resources:

1. https://ctr.utexas.edu/wp-content/uploads/pubs/0_6628_P1.pdf The Economics of Transportation Systems: A Reference for Practitioners

2. https://www.researchgate.net/publication/280313162_THE_ROLE_OF_TRANSPORTATION_IN_ECONOMIC_DEVELOPMENT The Role Of Transportation In Economic Development

3. https://supernet.isenberg.umass.edu/articles/EOLSS.pdf Mathematical Models Of Transportation And Networks

4. http://indiaenvironmentportal.org.in/content/388897/india-transport-report-moving-india-to-2032/ India transport report: moving India to 2032

5. https://egyankosh.ac.in/bitstream/123456789/30904/1/Unit-4.pdf Transport Economics

<div align="center">**SKILL ENHANCEMENT COURSE (SEC)**</div>

Course Title: Actuarial Economics
Course code: UG-ECO-SEC4
Credits: 3
Marks: 75
Duration: 45 Hours

Prerequisite Courses: (NIL)

Course Objectives:

The objective of this course is to provide tools for analyzing insurance and insurance risks. It also develops expertise in students that is relevant for research and training in insurance companies and helps them acquire a wide range of decision-making processes used for financial planning and management.

Course Learning Outcomes :

Upon completion of the course, the student will be able to:

CLO1: Explain key concepts in actuarial economics
CLO2: Calculate annuity and types of annuity and   Apply probability theory to insurance
CLO3: Examine and Interpret the life table for the calculation of premium.

Course Content:

Module 1: Introduction to Actuarial Economics   (15 Hours)
　　　　Origin, nature, and scope of Actuarial Economics; Its importance; Link between financial planning and risk management; Utility and risk preference; *Annuity: ordinary annuity, annuity due, deferred annuity; Perpetuity: present value of immediate perpetuity, the present value of perpetuity due, deferred perpetuity; Annuities with a frequency different from that with which interest is convertible; Varying rates of interest; Redemption of the Loan; Average interest yield on the life fund.

*Module 2: Mortality Tables   (15 Hours)
　　　　Probability theory in insurance; Mortality table: Concept and different columns of mortality tables; Select and Ultimate tables; Stages involved in the construction of mortality tables.

*Module 3: Pricing   (15 Hours)
　　　　Essential elements in the computation of life insurance premium; premium calculation; Level annual premium; Net premium calculation; formulae for calculation of net premium; commutation functions; Office premium: salary and salary-related expenses, property costs, computer systems costs, one-off capital expenses; Cash flow approach for pricing; Applications of cash flow projections; pricing application.

*Practical component

List of books recommended for reference

Mandatory reading:

1. Mishra K.C. & Kumar C.S., (2009), *Elements of Actuarial Science*, Cengage Learning, Delhi
2. Booth, P.M. et al., (1999), *Modern Actuarial Theory and Practice*, Chapman and Hall, London
3. David & Dickson (2019), Actuarial Mathematics for Life Contingent Risks, 3rd edition.**Cambridge University Press**

Supplementary Reading:

1. Newton Bowers et al., (1997), *Actuarial Mathematics*, Society of Actuaries, (second edition), Illinois.
2. Sherris, Michael, (2001), *Principles of Actuarial Science,* PDF
3. Marco Corazzaet et al. (2016), *Mathematical and Statistical Methods for Actuarial Science and Finance*, Springer International Publisher.

Online Resources:

1.https://www.researchgate.net/publication/306082366_Knowledge_and_Perceptions_of_Actuarial_Science_Among_Students_and_Academics_Evidence_from_JABU
2. https://www.casact.org/library/astin/vol36no1/1.pdf
3. https://faculty.wharton.upenn.edu/wp-content/uploads/2013/05/Lemaire_2005_Actuarial_1.pdf

Course Title: DATA MANAGEMENT AND PRESENTATION USING MICROSOFT EXCEL (SEC)
Course Code: UG-ECO-SEC5
Credits: 3
Marks: 75
Duration: 45 Hours

Prerequisite Courses: (NIL)

Course Objectives:

This course aims to understand the most extensive tool used for analysis in general and in Business Analytics. This course will equip students with hands-on skills in MS Excel operations, enabling them to analyze and interpret data for decision-making and enhance their skill-based learning.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:
CLO1: Explain the MS Excel interface and navigation.
CLO2: Acquire knowledge of various formulas and functions for data analysis.
CLO3: Apply advanced data management and automation techniques.

Course Content

Module I: Introduction to Excel and Data Entry   (15 Hours)
Introduction to Microsoft Excel: Interface, navigation, and basic functions; Data entry and formatting: Inputting data, formatting cells, and applying formulas; Sorting and filtering data: Organizing and analyzing data using sorting and filtering techniques; Data validation: Ensuring data accuracy and consistency through validation rules; Conditional formatting: Highlighting data based on specific criteria; Data tables: Creating and analyzing one-variable and two-variable data tables.

Module II: Data Analysis and Visualization   (15 Hours)

Formulas and functions: Working with mathematical, statistical, and logical functions; PivotTables: Creating dynamic summaries and analyzing large datasets using PivotTables; Charts and graphs: Visualizing data through various chart types and customizing visuals; Data analysis tools: Utilizing tools like Goal Seek, Solver, and Data Tables for advanced analysis; Data consolidation: Combining data from multiple sources and summarizing it in a single sheet; Advanced charting techniques: Creating advanced charts like waterfall charts and sparklines.

Module III: Advanced Data Management and Automation   (15 hours)

Advanced functions: Exploring advanced functions like VLOOKUP, IFERROR, and INDEX-MATCH; Macros and automation: Recording and running macros to automate repetitive tasks; Data cleaning and manipulation: Techniques for cleaning and transforming data for analysis; Data protection and security: Implementing data protection measures and securing workbooks; Collaboration and sharing: Collaborating on workbooks, sharing files, and tracking changes; Power Query: Extracting, transforming, and loading data from various sources.

List of books recommended for reference Mandatory reading:

1. Rajkumar, S., Nagarajan, G., & Naveen Kumar, M. (2010). *Fundamentals of MS Excel. Bangalore:* Jayvee International Publications.

2. Doge, M., & Stinson, C. (2012). *Microsoft Excel Latest Version Inside Out*. New Delhi: PHI Learning Private Limited.

3. Sengupta, C. (2012). *Financial Analysis and Modeling using Excel and VBA*. Wiley.

Supplementary reading:

1. Guerrero, H. (2010). *Excel Data Analysis – Modeling and Simulation*. Springer.

2. Winston, W. (2011). *Microsoft Excel 2013: Data Analysis and Business Modeling*. PHI.

3. Held, B. (2011). *Excel Functions and Formulas.* BPB Publications.

Online Resources:

1. **https://openoregon.pressbooks.pub/beginningexcel/chapter/1-2-entering-editing-and -managing-data/**

2. **https://support.microsoft.com/en-us/office/excel-video-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb**

3. **https://www.simplilearn.com/tutorials/excel-tutorial/data-analysis-excel#descriptive _statistics**

DISCIPLINE-SPECIFIC CORE COURSE

Course Title: Research Methodology in Economics

Course Code: UG-ECO-301

Credits: 4

Marks: 100

Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:

The course is designed to strengthen students' ability to organize and research economic issues and problems. They will learn about the conceptual and philosophical basis of research methodology in economics. The course shall impart knowledge on conducting applied economic research from topic selection, literature survey, formulation of research questions and hypothesis, selection of appropriate research method and empirical techniques, interpretation of results and inferences for policies.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO 1: Explain the key concepts, steps, and challenges in conducting effective social research.

CLO 2:Differentiate between various research methods and evaluate their applicability in social research.

CLO 3: Evaluate the appropriate data sources and sampling techniques.

CLO 4: Analyze suitable data collection and analysis techniques.

Course Content:

Module I: Social Research (15 Hours)

Social Research: Meaning, definition, aims, importance, steps in social research; Characteristics of good social research; Problems. Hypothesis**:** Meaning, importance, sources, forms & types; Testing of hypothesis: Concepts involved in hypothesis testing, steps involved in the formulation of hypothesis, difficulties.

Module II: Research Methods   (15 Hours)

Social Survey, Case Study; Experimental; Interdisciplinary methods; Statistical method: (Meaning, types, characteristics, merits & demerits)

Module III: Empirical Investigations   (15 Hours)

Choice of data: Primary or secondary; Sources of data; Sample versus Census survey; Sample survey method: Probability & Non-probability sampling methods, characteristics of good sample design; sampling & non-sampling errors.

Module IV: Collection & Data Analysis   (15 Hours)

Selection of appropriate methods of primary data collection: observation methods, interview method, questionnaire versus schedule; collection of secondary data; Data editing, tabulation and data analysis: Use of parametric & non-parametric tests.

List of books recommended for reference

Mandatory Reading

1. Kothari C.R (2013), *Research Methodology: Methods and Techniques*, New Age International Publishers. New Delhi.

2. Gerard, Gutherie (2010), *Basic Research Methods An Entry into Social Science Research*, Sage *Publications India, New Delhi.*

3. Young Pauline V. (1996), *Scientific Social Surveys and Research*, Prentice-Hall of India New Delhi.

4. Goode, W.J and Hatte, P.K (1981), *Methods in Social Research*, McGraw-Hill, Singapore.

Supplementary Reading

1. Flick, U (2011), *Introducing Research Methodology: A Beginner's Guide to Doing a Research Project,* Sage Publications India, New Delhi.

2. Fink, A. (2009), *Conducting Research Literature Reviews: From the Internet to Paper*, Sage Publications, New Delhi.

3. Baronov, David (2004), *Conceptual Foundations of Research Methods*, Paradigm Publishers, Boulder, US.

4. Cooper, R. Donald and Pamela S. Schindler (2003), *Business Research Methods*, Tata McGraw-Hill.

5. Shipman, Keith F, (1996), *Introduction to Social Research*, Sage, London.

Online resources:

1. https://www.unicef.org/easterncaribbean/ECAO_Barbados_Report_Social_Survey_on_Violence_against_Children_and_Women.pdf

2. https://www.researchgate.net/publication/235953309_Case_Study

3. https://www.researchgate.net/publication/316532311_Research_design_the_methodology_for_interdisciplinary_research_framework

4. https://www.researchgate.net/publication/320010397_Primary_Sources_of_Data_and_Secondary_Sources_of_Data

5. https://www.researchgate.net/publication/314239004_Sampling_-_Probability_Vs_Non-Probability

Course Title: Statistical Methods in Economics

Course Code: UG-ECO-302

Credits: 4

Marks: 100

Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:

Statistical Methods in Economics is designed to provide students with a comprehensive understanding of statistical techniques and their applications in economic analysis. The course emphasizes theoretical foundations and practical applications, equipping students with the necessary skills to analyze and interpret financial data effectively.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO1: Distinguish between qualitative and quantitative data and construct accurate graphical representations for data summarization.

CLO2: Compare the use of different central tendency measures.

CLO3: Evaluate measures of dispersion to interpret data variability.

CLO4: Analyze the results of appropriate parametric and non-parametric tests based on data characteristics.

Course Content:

Module I: Introduction to Statistics   (15 hours)

Introduction to Statistics in Economics, Importance of statistics in economics; Types of data: Qualitative and Quantitative; Scales of measurement: Nominal, Ordinal, Interval, Ratio; Types of variables, Frequency distribution, and tabulation; Graphical representation: Histograms, Frequency polygons, Ogive, Pie charts.

Module II: Measures of Central Tendency   (15 hours)

Arithmetic Mean (AM), Median, Mode, Geometric Mean (GM) and Harmonic Mean (HM), Properties of Good Average – Comparison of Different Averages –Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation and Variance

Module III: Measures of Dispersion   (15 hours)

Measures of Dispersion, Importance of dispersion in economics; Absolute and Relative, Range and Interquartile Range (IQR): Calculation, Deciles, and Percentiles, IQR as a measure of spread; Mean Deviation: Concept and calculation; Variance and Standard Deviation; Coefficient of Variation (CV); Skewness and Kurtosis

Module IV: Parametric Tests and Non-parametric Tests   (15 hours)

Introduction to Parametric and Non-parametric tests: Definition and key assumptions of parametric tests and non-parametric tests, Difference, Advantages and limitations, Types of Parametric tests: Z-Test, t-Test, Analysis of Variance (ANOVA), One-way ANOVA, Chi-Square Test for Variance, F-Test, Types of non-parametric tests: Non-Parametric Tests: Chi-Square Test, Mann-Whitney U Test, Wilcoxon Signed-Rank Test, Kruskal-Wallis H Test, Friedman Test, Spearman's Rank Correlation, Kolmogorov-Smirnov Test.

List of books recommended for reference

Mandatory Reading:

1. Gupta, S.C. (2018). Fundamentals of Statistics. Himalaya Publishing House.

Supplementary Reading

1. Singh, Y. K. (2006). Fundamental of research methodology and statistics. New Age International.
5. Cochran, William, G. (2008), Sampling Techniques, Third Edition, WileyIndia, ISBN 978 -81-265-1524-0.Reprint: 2008.
6. 4. Bethlehem, J. (2009), Applied Survey Methods: A Statistical Perspective, Wiley.
1. . Khandare V.B. and S. Yadav (2015), Statistical Methods, Chinmay Publication, Aurangabad.

Online resources:

4. **https://www.scribbr.co.uk/stats/measurement-levels/**
5. **https://www.thoughtco.com/levels-of-measurement-in-statistics-3126349**
6. **https://www.scribbr.co.uk/stats/measurement-levels/**

Course Title: Introduction to Econometrics

Course Code: UG-ECO-303

Credits: 4

Marks: 100

Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:

This course introduces students to the econometric methods used to conduct empirical analysis in Economics. The course provides the students with the basic quantitative techniques needed to undertake applied research projects. It also provides the base for more advanced optional courses in econometrics.

Course Learning Outcomes:

Upon completion of the syllabus students will be able to:

CLO1: Explain the application of the Ordinary Least Squares (OLS) method for estimating two-variable models.

CLO2: Conduct hypothesis testing for regression models

CLO3: Estimate and interpret the parameters of a multiple regression model

CLO4: Analyze the common issues in multiple regression analysis, while applying forecasting techniques using regression models.

Course Content:

Module I: Basic Ideas of Linear Regression: The Two-Variable Model   (15 Hours)

Population Regression Function; Classical Linear Regression Model. Linear Regression Method: Sample Regression Function, Meaning of "Linear" Regression. Method of Ordinary Least Squares for Two-variable regression; Least Squares Residuals, Variances and Standard Errors of Ordinary Least Squares [OLS] Estimators; BLUE Properties of OLS Estimators: The Gauss-Markov Theorem.

Module II: The Two-Variable Model: Hypothesis Testing.   (15 Hours)

Hypothesis Testing: Test of Significance Approach; Confidence Interval Approach; Analysis of Variance and Correlation: Sum of Squares; Use of F-ratio to Test the Regression Equation; Use of r^2 to obtain the Goodness of Fit.

Module III: Multiple Regressions: Estimation and Hypothesis Testing   (15 Hours)

Three-variable Regression Model; Meaning of Partial Regression Coefficients; Assumptions of the Classical Linear (Multiple) Regression Model, Multiple Regression Equation; Estimation of Parameters of Multiple Regression, (OLS Estimators); Variances and Standard errors of OLS Estimators. Properties of OLS Estimators of Multiple Regression, Testing the slope of an individual estimator; Testing the Regression Equation. F test, R Square, Adjusted R Square, Comparing two R^2 Values, Partial Correlation.

Module IV: Multiple Regression Problems and Forecasting   (15 Hours)

Multicollinearity: Perfect and Imperfect Multicollinearity; Consequences of Multicollinearity, Detection of Multicollinearity*, Corrections for Multicollinearity. Heteroscedasticity*; Nature of Heteroscedasticity, Consequences of Heteroscedasticity, Detection of Heteroscedasticity*, Corrections for Heteroscedasticity*.Serial Correlation; Nature of Serial Correlation, Consequences of Serial Correlation, Detection of Serial Correlation*, Corrections for Serial Correlation*, Specification Bias; Regression on Dummy Explanatory Variables*Forecasting with a Single-Equation Regression Model.

* In-class exercise using software packages.

List of books recommended for reference

Mandatory Reading:

1. Gujarati, Damodar N. (2009), *Basic Econometrics*, McGraw Hill, Singapore.
2. Ramanathan, Ramu (1998), *Introductory Econometrics with Applications*, Thomson Asia Pte Ltd., Singapore.

Supplementary Reading:

1. Gujarati, Damodar N. (1999), *Essentials of Econometrics*, Irwin/McGraw Hill, Singapore.
2. Studenmund, A. H. (1997), *Using Econometrics: A Practical Guide*, Adisson-Wesley, Reading, Mass.

Online resources:

1.https://instruction.bus.wisc.edu/jfrees/jfreesbooks/Longitudinal%20and%20Panel%20Data/Book/Chapters/FreesFinal.pdf

2. https://www.researchgate.net/publication/7222561_Study_Design_III_cross-sectional_studies/link/00463530cc57333de4000000/download

3. https://www.reed.edu/economics/parker/312/tschapters/S13_Ch_1.pdf

Course Title: Introduction to Operations Research for Economists

Course Code: UG-ECO-304

Credits: 04

Marks: 100

Duration: 60 Hours

Prerequisite Courses: (NIL)

Course Objectives:

The course provides students with a strong foundation in applying operations research (OR) in economics. It covers optimisation and decision-making techniques such as linear programming, transportation and assignment problems, decision theory, and decision trees. The course emphasizes practical problem-solving skills for challenges in production management, supply chain logistics, and resource allocation using OR techniques.

Course Learning Outcomes:

Upon completion of the course, the student will be able to:

CLO1: Explain the key concepts and techniques of operations research

CLO2: Formulate and solve linear programming problems

CLO3: Apply transportation and assignment models to optimize logistics and allocation problems in economics

CLO4: Apply decision theory and decision trees to evaluate various economic decisions under uncertainty

Course Content:

Module I: Basics of Operations Research   **(15 Hours)**

Development of Operations Research, the definition of operations research, characteristics of operations research, scientific method in operations research; Necessity and Scope of Operations Research: Necessity of Operations Research in Industry, Scope of Operations Research (Management and Financial Management), Operations Research and Decision Making; Objectives and Phases of Operations Research; Models in Operations Research: Types of Mathematical Models in OR, Classification Schemes of Models, Characteristics of a Good Model, Advantages and Limitations of Models, Constructing the Model and Approximation in OR Models; Application of

Various OR Techniques; Role of computers in operations Research; Difficulties and Limitations of Operations Research.

*Module II: Linear Programming Problem (LPP)   (15 Hours)

Elements of Linear Programming; Formulation of LPP; Solution to LPP: Graphical, Simplex and the Big M methods; Duality Principle.

*Module III: Transportation and Assignment Problems   (15 Hours)

Transportation Problem: General Mathematical Model of Transportation Problem; Methods for Finding Initial Solution: North-West Corner rule, Least Cost Method, Vogel's Approximation method; Optimality in Transportation problem by Modified Distribution (MODI) method; Maximization Transportation Problem; Trans-Shipment Problem.

Assignment Problem: Mathematical Models of Assignment Problem; Hungarian Method for Solving Assignment Problem; Maximization Case in Assignment Problem; Travelling Salesman Problem.

Module IV: Decision Theory and Decision Trees   (15 Hours)

Steps of Decision-Making Process; Types of Decision-Making Environments; Decision-Making Under Uncertainty: Optimism (Maximax or Minimin) Criterion, Pessimism (Maximin or Minimax) Criterion, Equal Probabilities (Laplace) Criterion, Coefficient of Optimism (Hurwicz) Criterion, Regret (Savage) Criterion; Decision-Making Under Risk: Expected Monetary Value (EMV), Expected Opportunity Loss (EOL), Expected Value of Perfect Information (EVPI); Decision Trees Analysis; Decision-making with Utilities: Utility Functions, Utility Curve, Construction of Utility Curves.

*Practical component to be taught using Microsoft Excel.

List of books recommended for reference

Mandatory Reading

1. Gupta, P. K., & Hira, D. S. (2007). Operations Research. S. Chand & Company Ltd.
2. Taha, H. A. (2006). Operations Research: An Introduction (7th ed.). PHI Private Limited.
3. Sharma, J. K. (2022). Operations Research: Theory and Applications (6th ed.). Macmillan India Ltd.

Supplementary Reading

1. Taha H., (2006), Operation Research: An Introduction, Pearson, 7th Edition
2. Kantisawrup et al, (2005), *Operations Research*, S Chand & sons, New Delhi

Online resources:

1. https://ocw.mit.edu/courses/sloan-school-of-management/15-093j-optimization-methods-fall-2009/
2. https://www.coursera.org/lecture/mathematics-everyday/linear-programming-KRmzh
3. https://www.edx.org/course/operations-research-the-transportation-problem
4. https://www.maths.ed.ac.uk/~gondzio/teaching/ip/lecture3.pdf
5. https://www.analyticsvidhya.com/blog/2016/04/complete-tutorial-tree-based-modeling-scratch-in-python/