

# SHIV NADAR UNIVERSITY

## CHENNAI

(State Private University established under the Shiv Nadar University Act, 2018)  
RAJIV GANDHI SALAI (OMR), KALAVAKKAM - 603 110 TAMIL NADU  
SCHOOL OF SCIENCE AND HUMANITIES  
DEPARTMENT OF ECONOMICS

### Semester I

#### Microeconomics I

Course Category	L	T	P	C
MC	3	1	0	4

#### Detailed Contents of Syllabus

##### Unit 1: Introduction to Microeconomics- -10 Hours

Scope and Methods of Economics; Basic Economic Problem: Scarcity and Choice; Opportunity Cost and Production Possibility Frontier; Demand and Supply: Market Equilibrium

##### Unit 2: Consumer Theory- 20 Hours

Utility Theory: Cardinal vs. Ordinal Approach; Indifference Curve Analysis; Budget Constraint and Consumer Equilibrium; Income and Substitution Effects (Hicksian and Slutsky Approaches); Elasticity of Demand

##### Unit 3: Producer Theory and Cost Analysis –20 Hours

Production Function: Short-run and Long-run; Law of Variable Proportions and Returns to Scale; Cost Curves and Their Relationship (Short-run & Long-run); Revenue Curves and Profit Maximization

##### Unit 4: Market Structures –10 Hours

Perfect Competition: Equilibrium –Short run and long run; Consumer Surplus; Efficiency

**Total: 60 hours including Tutorials**

#### Textbooks and References:

- Varian, H. R. (2019). Intermediate Microeconomics: A Modern Approach. W.W. Norton
- Koutsoyiannis, A. (2003). Modern Microeconomics. Palgrave Macmillan
- Pindyck, R. S., & Rubinfeld, D. L. (2017). Microeconomics. Pearson
- Nicholson, W., & Snyder, C. (2022). Fundamentals of Microeconomics. Cengage

## Macroeconomics-I

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Contents of Syllabus

#### Unit I: Introduction to Macroeconomics and National Income Accounting

Basic issues in macroeconomics; Macroeconomic goals, measurement of national income and the circular flow; approaches to measure national income, national income identities; real versus nominal GDP; price indices; national income accounting for an open economy; balance of payments: current and capital accounts, trends and business cycles.

**15 Hours**

#### Unit II: Money and Inflation

Properties and functions of money; demand for money and supply of money, measures of money stock and high-powered money, money multiplier, Inflation: definition and measurement, Demand pull and cost-push inflation, inflation categories by intensities, expected vs unexpected inflation, hyperinflation, social costs of inflation; Anti-inflationary policy

**15 Hours**

#### Unit III: Classical Macroeconomics

Say's Law, The Classical full employment model, Wage-Price Flexibility and The Classical Labor Market, Effect of Change in Money Supply, Shift of Labour Supply Function, Shift of Production Function, the Classical Dichotomy, The Classical theory of Saving, Investment and the Interest rate, Critique of Classical economics

**15 Hours**

#### Unit IV: Simple Keynesian Model

Components of Aggregate Demand, Consumption function and Savings functions, Concepts of propensities to consume, save and import; Simple Keynesian model of income determination, AD-AS model: Goods, money and labor markets, Multipliers- Investment, government expenditure multiplier and the tax rate multiplier; the balanced budget multiplier; Tax multiplier, Investment Multiplier, Critique of Keynesian model

**8 Hours**

**Unit V: Keynesian Models versus Classical Models** IS-LM model for a closed economy, Synthesis between classical models and Keynesian models, interpretation and policy analysis

**7 Hours**

**Total: 60 hours including Tutorials**

### Textbooks

1. Gregory Mankiw, N. Macroeconomics. 11th International Edition, Paperback. Worth Publishers Inc., U.S., 10 November 2021.
2. Froyen, Richard T. Macroeconomics: Theories and Policies. 10<sup>th</sup> Edition Paperback. Pearson Education India, 1 January 2013.

## Mathematics

Course Category	L	T	P	C
MD	3	1	0	4

### Detailed Contents of Syllabus

#### Unit 1: Functions and Differentiation

Functions: domain and range, representations of functions, types of functions: constant function, polynomial functions, exponential function, trigonometric functions and identities, new functions from old functions. Differentiation: Simple, Logarithmic differentiation, higher order differentiation, Maxima and minima of one variable. 14 Hours

#### Unit 2: Partial differentiation

Partial differentiation, homogeneous function and Euler's theorem, maxima and minima of two variables, constrained maxima and minima. 12 Hours

#### Unit 3: Integral Calculus and Differential equations

Integration: Basic rules of integration, Integration by substitution, Integration by parts, Bernoulli formula, method of partial fractions. Definite Integrals. Differential Equations: Introduction, first linear differential equation and separable case. 14 Hours

#### Unit 4: Matrices and System of linear equations

Matrices, Algebra of matrices, determinants, inverse of a matrix, solution of a system of linear equations, Cramer's rule, matrix inversion method. 10 Hours

#### Unit 5: Eigenvalues and Eigenvectors

Characteristic equations, eigenvalues and eigenvectors, properties of eigenvalues and eigenvectors. 10 Hours

#### Textbooks

1. Anthony, Martin., Biggs, Norman. Mathematics for Economics and Finance: Methods and Modelling. United States: Cambridge University Press, 2024.
2. Sydsaeter, Knut and Hammond, P. Mathematics for Economic Analysis. India: Dorling Kindersley, Pearson Education, 2013.
3. Dowling, Edward T. Schaum's Outline of Mathematical Methods for Business and Economics. United States: McGraw Hill LLC, 2009.

**Total: 60 hours including Tutorials**

## Statistics I

Course Category	L	T	P	C
MD	3	1	0	4

### Detailed Contents of Syllabus

#### **Unit I: Organization and Presentation of Data** **12 Hours**

Statistical Representation of Data, Diagrammatic Representation of Data, Frequency Distribution, Graphical Representation of Frequency Distribution - Histogram, Frequency Polygon, Ogive, Pie-chart- Implementation in Excel

#### **Unit II: Measures of Central Tendency and Dispersion** **12 Hours**

Measures of Central Tendency and Dispersion: Mean, Median, Mode, Mean Deviation, Quartiles and Quartile Deviation, Standard Deviation, Coefficient of Variation, Coefficient of Quartile Deviation- Implementation in Excel

#### **Unit III: Correlation Analysis** **12 Hours**

Introduction - Bivariate Data - Correlation Analysis - Measures of Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation

#### **Unit IV: Regression Analysis** **12 Hours**

Regression Analysis - Linear Regression - Relation between Correlation and Regression- method of least squares - Implementation in Excel

#### **Unit IV: Probability** **12 Hours**

Probability, Axiom, Laws of Probability - Conditional Probabilities, Independent and Dependent Events - Mutually Exclusive Events - Total Probability - Bayes Theorem

**Total: 60 hours including Tutorials**

### SUGGESTED READINGS:

1. Sweeney, Dennis J., Williams, Thomas Arthur., Anderson, David R. Statistics for Business and Economics. United Kingdom: Cengage Learning, 2020.
2. Levin, Richard I., David S. Rubin., Sanjay Rastogi and Masood Husain Siddiqui. Statistics for Management. Eighth edition. India: Pearson Education, 27 January 2017.
3. Spiegel, Murray R., Stephens, Larry J and Narinder Kumar. Statistics (Schaum's Outline Series) Paperback. McGraw-Hill Education, 1 July 2017.
4. Gupta, S.C. Fundamentals of Statistics. Seventh Edition, Paperback. Himalaya Publishing House, 1 May 2018.
5. Gupta, S.C and Kapoor, V.K. Fundamentals of Mathematical Statistics. India: Sultan Chand & Sons, 2020.

## Communication Skills in English

Course Category	L	T	P	C
AEC	2	1	0	3

### Detailed Contents of Syllabus

#### **Unit 1:** **10 Hours**

Reading: Short comprehension passages; Practice in skimming, scanning, and predicting

Writing: Understanding text structure (Use of reference words and discourse markers, coherence markers, reordering jumbled sentences)

Speaking: Introducing oneself; Exchanging personal information

Listening: Comprehending formal and informal conversations

Language Development: Asking and answering - Wh- and Yes/No questions; Prepositions; Conjunctions; Pronouns; Clauses

Vocabulary Development: Prefixes and Suffixes

#### **Unit 2:** **10 Hours**

Reading: Short narratives and descriptions from newspapers

Writing: Instructions, recommendations; Paragraph writing (including compare and contrast)

Listening: Telephonic conversations; short presentations and news

Speaking: About oneself and others; Routine actions

Language development: Tenses; Modal verbs

Vocabulary development: Guessing meanings of words/expressions from the context

#### **Unit 3:** **10 Hours**

Reading: Short texts and longer passages (Intensive reading)

Writing: Letters (informal and formal); E-mails (personal and professional)

Listening: Short dialogues and longer conversations

Speaking: Expressing opinions; Making short presentations

Language development: Degrees of comparison; subject-verb agreement

Vocabulary development: Idioms and phrases; Single word substitutes; Adverbs

#### **Unit 4:** **8 Hours**

Reading: Longer texts of different types (journalistic, literary); note-taking, note-making

Writing: Essays (including analytical and issue-based)

Listening: TED talks

Speaking: Role-plays

Language development: Passive voice

Vocabulary development: Synonyms and Antonyms; Phrasal verbs

#### **Unit 5:** **7 Hours**

Reading: Longer academic texts

Writing: Interpreting charts and graphs; Reports

Listening: Listening to technical talks and academic lectures Speaking: Interviews and short group discussions Language development: Reported speech

Vocabulary development: Collocations

**Total: 45 hours including Tutorials**

## REFERENCE BOOKS

1. Richards, C. Jack. Interchange Level 2 Student's Book with Online Self-Study. 5th edition, Paperback. New Delhi: Cambridge University Press, 6 July 2017.
2. Bailey, Stephen. Academic Writing: A Practical Guide for Students. Paperback. United Kingdom: Routledge Falmer, 2003.
3. Means, L. Thomas, and Elaine Langlois. English & Communication for Colleges. 4th edition, Paperback. South-Western Pub, October 2, 2006.
4. Redston, Chris & Gillies Cunningham. Face2Face (Pre-intermediate Student 's Book with Online Workbook). 2<sup>nd</sup> Edition, Paperback – Student Edition. New Delhi: Cambridge University Press, 25 June 2020.
5. Comfort, Jeremy, et al. Speaking Effectively: Developing Speaking Skills for Business English. Paperback. Cambridge University Press, 9 June 1994.
6. Board of Editors. Using English: A Course Book for Undergraduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad, 2015.
7. Dutt P, Kiranmai and Rajeevan Geeta. Basic Communication Skills. Foundation Books, 2007.

## MS Excel

Course Category	L	T	P	C
SEC	0	0	4	2

### Detailed Contents of Syllabus

**Unit 1: Basic Excel functions:** Structure of an excel function, functions such as SUM (), MIN (), MAX (), AVERAGE (), COUNT (), AUTOSUM, AUTOFILL. Working with Excel Name Ranges, Using Excel's IF () Function, Nesting Functions, Using Excel's COUNTIF () Function, Using Excel's SUMIF () Function, Using Excel's IFERROR () Function **10 Hours**

**Unit 2: Working with an Excel List:** Understanding Excel List Structure, Sorting a List Using Single Level Sort, Sorting a List Using Multi-Level Sorts, Using Custom Sorts in an Excel List, Filter an Excel List Using the AutoFilter, Creating Subtotals in a List, Format a List as a Table, Using Conditional Formatting to Find Duplicates, Removing Duplicates. **Excel Data Validation:** Understanding the Need for Data Validation, Creating a Validation List, Adding a Custom Validation Error, Dynamic Formulas by Using Validation Techniques. **Excel's Lookup Functions:** Using Excel's VLOOKUP() Function, Using Excel's HLOOKUP() Function, Using Excel's INDEX() and MATCH() Functions.

**20 Hours**

**Unit 3: Preparation of various types of charts-**line graphs, pie charts, hierarchical charts, stock and waterfall charts, radar charts, Combo Charts, scatter plots, etc. **Data organization and management:** Creating Simple and classic pivot tables, Choosing Field, Filtering Pivot Tables, Modifying PivotTable Data, Grouping based on numbers and Dates; Working with Large Sets of Excel Data; Using the Freeze Panes Tool, Grouping Data (Columns and/or Rows), Consolidating Data from Multiple Worksheets.

**20 Hours**

**Unit 4: Advanced formulae Using Data Analysis tools for ANOVA, Correlation, Covariance, Descriptive Statistics, Exponential Smoothing, F-Test: Two Sample for Variances, Histogram, Random Number Generation, Rank and Percentile, Regression, Sampling, t-Test, etc.**

**10 Hours**

**Total Hours: 60**

### Reference Books

1. Alexander, Michael., Kusleika, Richard., Walkenbach, John. Excel 2019 Bible. United States: Wiley, 2018.
2. Walkenbach, John. Excel Charts. United Kingdom: Wiley, 2016
3. Lalwani, Lokesh. Excel 2019 All-in-One: Master the New Features of Excel 2019 / Office 365. Paperback. India: BPB Publications, 2019.

## Semester II

### Microeconomics-II

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### Unit 1: Market Structures

**20 Hours**

Monopoly: meaning – features - causes - Monopolist's Revenue Curves - Equilibrium of a Monopoly Firm - Short run Equilibrium - Price Discrimination – meaning, conditions and objectives – equilibrium under price discrimination – economic effects of monopoly - Imperfect competition-monopolistic competition – features – price and output determination - Monopoly: Features, price and output determination-Short-run and long-run equilibrium-Oligopoly: features and types-Cournot-Stackelberg-Bertrand oligopoly market- Price leadership model and cartels

#### Unit 2: General Equilibrium and Welfare Economics

**10 Hours**

General Equilibrium and Economic Efficiency- Exchange, production and welfare, Pareto Optimality, Edgeworth box and contract curve, Pareto efficiency and perfect competition, Reasons for Market failure, Pareto efficiency, contract curve; efficiency and welfare economics: fundamental theorems of welfare economics.

#### Unit 3: Choice under Uncertainty

**15 Hours**

Choice under Uncertainty and Intertemporal Choice -Choice under uncertainty – utility function and expected utility, risk aversion and risk preference; intertemporal choice: savings and borrowing, asymmetric information and moral hazard: principal agent problem, theory of lemon, credit market.

#### Unit 4: Introduction to Game Theory

**15 Hours**

Definition, Classification-Element -Types-Representation -Static Games of Complete Information: Nash Equilibrium -Dynamic Games of Complete Information: Subgame Perfection -Simultaneous and Sequential Game–solution techniques-Applications- Numerical Problems of Simultaneous Move Game and Sequential Move Game.

**Total: 60 hours including Tutorials**

### Textbooks

1. Varian, Hal R. Intermediate Microeconomics: A Modern Approach. Paperback. United Kingdom: W.W. Norton, 2019.
2. Snyder, C and Nicholson, W. Fundamentals of Microeconomics. Indian edition, Paperback. India: Cengage Learning, 1 January 2011.
3. Osborne, Martin J. An Introduction to Game Theory. Indian Edition, 1<sup>st</sup> Edition, Paperback. India: Oxford University Press, 2 July 2012.
4. Nicholson, W., & Snyder, C. (2022). *Fundamentals of Microeconomics*. Cengage
5. Koutsoyiannis, A. (2003). *Modern Microeconomics*. Palgrave Macmillan

## Macroeconomics II

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### Unit 1: Aggregate Demand (AD) and Aggregate Supply (AS) Curves

Interaction of aggregate demand and supply, 'Full employment' and 'Underemployment' equilibrium in the AD-AS model and adjustment process.

**10 Hours**

**Unit 2. Inflation, Unemployment and Expectations:** Phillips curve; Expectation Augmented Phillips curve, short-run trade-off and long-run relation between inflation and unemployment, adaptive and rational expectations; policy ineffectiveness debate.

**10 Hours**

#### Unit 3. Microeconomic Foundations of macroeconomics: Consumption Functions-

Keynesian consumption function, life-cycle and permanent income hypotheses; rational expectations and random-walk of consumption expenditure; Fisher's theory of optimal intertemporal choice, Determinants of investment. Savings Paradox

**10 Hours**

#### Unit 4. Open Economy Macroeconomic Models

Short-run open economy models; Mundell-Fleming model; Efficacy of monetary and fiscal policies with fixed and flexible exchange rates/capital im(mobility)

**10 Hours**

**Unit 5. Economic Growth and Fluctuations:** Harrod-Domar model; Solow model; golden rule; technological progress and elements of endogenous growth, Real Business Cycles

**10 Hours**

**Unit 6: Money Supply and Monetary Frameworks:** Monetary policy rules-Monetary targeting, inflation targeting and interest rate targeting, Public Debt and Deficit: Traditional View of Government Debt

**10 Hours**

**Total: 60 hours including Tutorials**

### READINGS:

1. Dornbusch, Rudiger., Fischer, Stanley and Startz, Richard. Macroeconomics. 12th Edition, Paperback. India: McGraw Hill Education, 27 August 2018.
2. Gregory Mankiw, N. Macroeconomics. 11th International Edition, Paperback. Worth Publishers Inc., U.S., 10 November 2021.
3. Froyen, Richard T. Macroeconomics: Theories and Policies. 10th Edition Paperback. Pearson Education India, 1 January 2013.
4. Sikdar, Soumyen. Principles of Macroeconomics. 3rd Edition, Paperback. India: Oxford University Press, 14 October 2020.

## Mathematical Economics

Course Category	L	T	P	C
MC	3	0	0	3

### Detailed Syllabus

#### Unit 1: Static and Dynamic Optimization in Economics

15 Hours

Supply-Demand Analysis with alternative functional forms-linear and nonlinear.

- Estimation of demand function under different market structure using specific functional forms; estimation of market supply function using specific production functions.
- Equilibrium determination with alternative assumptions of objectives of firms, sales and profit maximization.
- Subsidies and Taxation: market equilibrium.
- Estimating elasticity of demand and its implications for revenue using different types of demand, cost, revenue functions
- Utility maximization under budget constraints – Convexity and concavity applications in economics; Conversion of indirect utility, indirect expenditure function-Duality.
- Production Optimisation - Output Maximization & Cost Minimization: Estimation
- Intertemporal Consumption: Decision-making over time - Analysis of multidimensional economic problems (e.g., Cobb-Douglas production function).

#### Unit 2: Applications of Integral Calculus in Economics

10 Hours

- Estimating Consumer and Producer Surplus; Measure welfare changes due to price changes
- Estimating Tax Burden using specific demand and supply function
- Measuring Subsidy Effects - redistribution and efficiency impacts.
- Deriving total cost cost and revenue functions from MC and AC
- Income Distribution Analysis: Use Lorenz Curve and Gini Coefficient to measure inequality.
- Estimate income shares, risk, and uncertainty in economics.

#### Unit 3: Mathematical Applications in Macroeconomics

10 hours

- Consumption function: Linear and non-linear, Average and Marginal Propensity to Consume
- Concept of limits and investment Multiplier: Accelerator and Multiplier Analysis
- Understand sensitivity of inflation to demand/supply.
- Estimating parameters of Keynesian macroeconomic model using Cramer's Rule

#### **Unit 4: Input-Output Analysis and Forecasting**

**10 Hours**

- Leontief Input-Output Models: Analysis of inter-industry relationships; General Equilibrium Representation with matrix form.; Model the interdependence of markets.
- National Production Forecasting: Use systems of differential equations and simultaneous equation application

**Total: 45 hours**

#### **Textbooks**

1. Chiang, A. C., & Wainwright, K. (2005). *Fundamental Methods of Mathematical Economics* (4th ed.). McGraw-Hill Education.
2. Simon, C. P., & Blume, L. (1994). *Mathematics For Economists*. W. W. Norton & Company.
3. Henderson, J. M., & Quandt, R. E. (2006). *Microeconomic Theory: A mathematical approach* (3rd ed.). Tata McGraw-Hill. (Select Portion)
4. Dowling, E. T. (2001). *Schaum's Outline of Mathematical Economics* (3rd ed.). McGraw-Hill.

## Statistics II

Course Category	L	T	P	C
MD	3	0	0	3

### Detailed Contents of Syllabus

#### Unit I: Random Variables

9 Hours

Random Variables: Discrete and Continuous Random Variables, Probability Mass and Density Functions - Cumulative Distributive Functions- Mean, Variance, Moments-skewness and kurtosis

#### Unit II: Theoretical Distributions

9 Hours

Binomial - Poisson – Geometric- Uniform-normal distributions

#### Unit III: Testing of Hypothesis of Large Samples

9 Hours

Sampling distributions – Estimation of parameters – interval estimation -Statistical hypothesis – Large sample tests based on Normal distribution for proportion, mean

#### Unit IV: Testing of Hypothesis of Small Samples

9 Hours

Tests based on t distribution, confidence interval -Chi-square and F distributions for mean, variance– Contingency table (test for independent) – Goodness of fit- Implementation in Excel

#### UNIT V: Design of Experiments

9 Hours

One way and Two-way classifications – Completely randomized design – Randomized block design – Latin square design

**TOTAL: 45 hours**

### SUGGESTED READINGS:

1. Sweeney, Dennis J., Williams, Thomas Arthur., Anderson, David R. Statistics for Business and Economics. United Kingdom: Cengage Learning, 2020.
2. Levin, Richard I., David S. Rubin., Sanjay Rastogi and Masood Husain Siddiqui. Statistics for Management. Eighth edition. India: Pearson Education, 27 January 2017.
3. Spiegel, Murray R., Stephens, Larry J and Narinder Kumar. Statistics (Schaum's Outline Series) Paperback. McGraw-Hill Education, 1 July 2017.
4. Gupta, S.C. Fundamentals of Statistics. Seventh Edition, Paperback. Himalaya Publishing House, 1 May 2018.
5. Gupta, S.C and Kapoor, V.K. Fundamentals of Mathematical Statistics. India: Sultan Chand & Sons, 2020.

## Programming in Python

Course Category	L	T	P	C
MC	2	0	2	3

### Detailed Contents of Syllabus

#### Unit 1: Data, Expression, Statement, Conditional

10 Hours

Data and types: int, float, boolean, string, list; variables, expressions, statements, simultaneous assignment, precedence of operators; comments; in-built modules and functions; Conditional: boolean values and operators, conditional (if), alternative (if-else), case analysis (if-elif-else).

#### Unit 2: Iteration, Function, Strings

10 Hours

Iteration: while, for, break, continue, pass; Functions: function definition, function call, flow of execution, parameters and arguments, return values, local and global scope, recursion; Strings: string slices, immutability, string functions and methods, string module.

#### Unit 3: Lists, Tuples, Dictionaries

10 Hours

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, nested lists, list comprehension; Tuples: tuple assignment, tuple as return value, tuple operations. Dictionaries: operations and methods, looping and dictionaries, reverse lookup, dictionaries and lists

#### Unit 4: Logic Building and Problem Solving

15 Hour

Problem-solving process: decomposition, flowcharts, pseudocode, tracing, debugging; Logic puzzles: water jug problem, Tower of Hanoi, N-Queens, number guessing, FizzBuzz, palindrome, prime numbers; Algorithmic thinking: recursion vs iteration, constraint satisfaction, backtracking.

**Total Hours: 45**

### TEXT BOOKS

1. Downey, Allen. Think Python: How to Think Like a Computer Scientist. 2nd Edition, Paperback. Japan: O'Reilly Media, 2015.

### REFERENCES

1. Gutttag, John V. Introduction to Computation and Programming Using Python, Third Edition: With Application to Computational Modeling and Understanding Data. United Kingdom: MIT Press, 2021.
2. Sedgewick, Robert., Wayne, Kevin., Dondero, Robert. Introduction to Programming in Python: An Interdisciplinary Approach. United Kingdom: Pearson Education, 2015.
3. Budd, Timothy. Exploring Python. Paperback. United States: McGraw Hill Higher Education, 29 July 2011.
4. Lambert, Kenneth A.. Fundamentals of Python: First Programs.3<sup>rd</sup> Edition, Paperback. United States: Cengage, 2023.

## SQL Programming

Course Category	L	T	P	C
SEC	1	0	2	2

### Detailed Syllabus

**Unit 1:** Structured English Query Language (SQL)- Introduction- Storing, Retrieving, and Manipulating Data in Databases, Looping, Logic Directives, Variables, Markup, Concept of Tables **15 Hours**

**Unit 2:** SQL Language Elements: Keywords- Add, Join, View, Identifiers, Expressions, Search Conditions, Data Types, Nulls, Comments, etc **15 Hours**

**Unit 3:** List of SQL Commands: **Creation of Database Tables**, Finding/Extraction of Data, Data Adjustments, Data Deletion, Removing Tables from Database, insertion of New Data into the Database, etc **15 Hours**

### Learning Resources:

<https://online.stanford.edu/lagunita-learning-platform>

[https://sqlzoo.net/wiki/SQL\\_Tutorial](https://sqlzoo.net/wiki/SQL_Tutorial)

## Environmental Management and Sustainability

Course Category	L	T	P	C
VAC	3	0	0	3

### **Unit 1: Introduction and Natural Resources**

Multidisciplinary nature of environmental studies Renewable and non-renewable resources: Natural resources and associated problems. Forest, water mineral, food, Energy, land resources overutilization, Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. **5 hours**

### **Unit 2: Ecosystems**

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: - Forest ecosystem Grassland Ecosystem Desert Ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) - Biodiversity and its conservation Definition: genetic, species and ecosystem diversity. Biogeographical classification of India Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels. India as a mega-diversity nation Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **10 hours**

### **Unit 3: Environmental Pollution**

Definition - Cause, effects and control measures - Air pollution - Water Pollution Soil Pollution Marine Pollution Noise Pollution Thermal Pollution Nuclear Hazards Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides. **10 hours**

### **Unit 4: Sustainability, Social Issues and the Environment**

From Unsustainable to Sustainable Development Urban problems related to energy Water conservation, rainwater harvesting, watershed management Resettlement and rehabilitation of people its problems and concerns. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act Wildlife Protection Act Forest Conservation Act Issues involved in enforcement of environmental legislation - Public awareness. **10 hours**

## **Unit 5: Human Population and the Environment**

Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

**10 hours**

**Total Hours: 45**

### **Suggested Readings**

#### **Books**

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad, India,
2. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T, Environmental Encyclopedia, Jaico Publishing House, Mumabai,
3. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
4. Sapru R.K, Environment Management in India, Vol. I & Vol. II Ashish publishers house, New Delhi.
5. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines,

**Note: Latest edition of textbooks to be used.**

## Semester III

### Basics of Finance

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### Unit 1 – Introduction to Accounting and Finance

Basic accounting terms, principles and concepts - Meaning of Finance – Dimensions of finance – Role of accounting and relevance to finance – Misconceptions about finance, financial management and accounting – accounting concepts for understanding financial values – Use of accounting information for financial decision making - Difference between Personal financial decisions vs. Corporate Financial decisions. **12 hours**

#### Unit 2 – Time Value of Money in corporate vs. personal finance contexts

Concept of Time value of money and applications in corporate finance and personal finance - Present value and future value - Compounding and discounting Annuities and perpetuities

Capital structure - debt vs. equity - Cost of capital - Capital budgeting basics (NPV, IRR, Payback period) - Working capital management **12 hours**

#### Unit 3 – Fundamentals of investment in corporate vs. personal finance contexts

Objectives of personal finance – Objectives of corporate finance – Corporate investments (Capital, financial investments, mergers and acquisition, R&D investments, working capital investments) - Personal investments (instruments)

Risk (different types of risks) and return concepts – Diversification – Time horizons and liquidity **12 hours**

#### Unit 4 – Use of Financial Statements and Analysis

Introduction to Balance Sheet - Income Statement - Cash Flow Statement - Basic financial ratios - Liquidity (Current ratio, Quick ratio) -Profitability (Net profit margin, ROE, ROA) - Solvency (Debt-equity ratio) - Efficiency (Inventory turnover, Receivables turnover) **12 hours**

#### Unit 5 – Ethics and Emerging trends in finance

Importance of ethics in finance - Financial scams and lessons - Fintech, digital wallets, blockchain basics - Cryptocurrencies - ESG investing - Robo-advisory platforms – Behavioural Finance **12 hours**

**Total: 60 hours including Tutorials**

#### Textbooks:

1. Khan and Jain. Basic Financial Management, McGraw Hill Education
2. Maheswari S.N., Management Accounting and Financial Control. Sultan Chand & Sons
3. Shukla, M.C, Grewal, T.S and Gupta, S C. Advanced Accounts Volume-I., S. Chand Limited.
4. I.M. Pandey. Financial Management. Vikas Publications.
5. Rustagi, R.P. Fundamentals of Financial Management. Taxmann Publication Pvt. Ltd.
6. Jain, D. Cost & Management Accounting. Taxmann Publications
7. Saravana Prasath, B. Students' Handbook on Cost and Management Accounting. Commercial Law Publishers India) Pvt. Ltd.
8. Jain, S.P. and K.L. Narang. *Cost Accounting*. Kalyani Publishers. New Delhi.

## Basic Econometrics

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### Unit 1: Introduction 10 Hours

Review of Statistics: Sampling Distribution, Estimation of Parameters, Hypothesis Testing

#### Unit 2: Classical Linear Regression Model 20 Hours

Classical Linear Regression Model: Assumptions, Two variable & Multiple Variable Regressions analysis, Properties of Least Squares estimates; tests of hypotheses and confidence intervals

#### Unit 3: Violations of Classical Assumptions 20 Hours

Violations of classical assumptions: Multi-collinearity; Heteroscedasticity; Auto-correlation; measurement error, omitted variables

#### Unit 4: Discrete Response Models 10 Hours

Introduction to binary variables, Linear probability models and their limitations, Normal and Logistic curve, Probit and Logit models

**Total: 60 hours including tutorials**

### Textbook

1. Christopher Dougherty. Introduction to Econometrics. Fourth Edition, Paperback. Oxford University Press, September 28, 2011
2. Gujarati, Damodar N and Porter, Dawn C. Basic Econometrics. Fifth Edition, Hardcover. McGraw Hill Education, October 8, 2008

### Reference Books

1. Greene, William H. Econometric Analysis. Eighth edition, Paperback. Pearson Education, 8 May 2018.
2. Johnston, Jack and DiNardo, John. Econometric Methods. 4th Revised Edition, Paperback. McGraw-Hill Education, 2007.

## Introduction to Data Science

Course Category	L	T	P	C
MC	3	0	2	4

### Detailed Syllabus

#### Introduction to Data Science

##### **Unit 1: Introduction to Data Science** **12 Hours**

Introduction: Need for data science – Benefits and uses – Facets of data – Big data ecosystem – The data science process: Retrieving data – Cleansing, integrating and transforming data – Data analysis – Build the models – Presenting findings and building applications.

##### **Unit 2: Toolboxes for Data Scientists** **12 Hours**

Introduction to Python; Fundamental Python Libraries for Data Scientists : NumPy – SciPy – ScikitLearn – Pandas – Matplotlib; IDE; Data Manipulation with Python

##### **Unit 3: Descriptive Statistics** **12 Hours**

Introduction – Data Preparation – Exploratory Data Analysis: Data summarization – Data distribution – Outlier Treatment – Measuring asymmetry – Continuous distribution; Estimation: Mean – Variance – Sampling – Covariance – Correlation.

##### **Unit 4: Statistical Inference** **12 Hours**

Introduction – Frequentist Approach – Measuring the Variability in Estimates: Point estimates – Confidence intervals; Hypothesis Testing: Using confidence intervals – Using p-values.

##### **Unit 5: Machine Learning** **12 Hours**

Supervised Learning: Introduction – kNN classifier; Regression analysis: Linear regression – Logistic regression; Unsupervised Learning: Introduction – Clustering; Evaluation metrics.

**Total Hours: 60**

### Textbooks

1. Cielen, Davy., Meysman, Arno D.B. and Ali, Mohamed. Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools. Paperback. United Kingdom: Manning Publications, 2016.

## Game Theory

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### **Unit 1: Simultaneous Move Games with Complete Information** **25 Hours**

Introduction- Definition, types of game -representation of a game, the normal form; basic concepts; Dominated strategies Iterated dominance; Best responses; Rationality; Knowledge, common knowledge-solution concept: Iterated deletion of strictly and weakly dominated strategies; Best Response Functions and Nash equilibrium, mixed and pure strategies; applications –Finding pure strategy Nash equilibria in finite games; Applications.

#### **Unit 2: Extensive Form Games with Perfect Information** **20 Hours**

The game tree; strategies; subgame perfection; backward induction; commitment; bargaining; other Applications-Oligopoly model-applications

#### **Unit 3: Simultaneous Move Games with Incomplete Information** **15 Hours**

Incomplete information game structure- types, representation- Strategies; Bayesian Nash equilibrium; applications-Cournot duopoly with private information; Perfect Bayesian Nash equilibrium and sequential equilibrium

**Total - 60 hours including tutorial**

### Textbooks

1. Osborne, Martin J. An Introduction to Game Theory. First Edition, Paperback. India: Oxford University Press, 2 July 2012.
2. Gibbons, Robert. A Primer in Game Theory. Paperback. Pearson, 1 January 2018.
3. Fudenberg, Drew and Tirole, Jean. Game Theory. Paperback. ANE Books, 1 December 2005.
4. Osborne, Martin J and Rubinstein, Ariel. A Course in Game Theory. Paperback. United Kingdom: MIT Press, 1994.

## Econometrics Lab

Course Category	L	T	P	C
SEC	0	0	2	1

### Detailed Syllabus

**Unit 1: Linear Regression Model:** Estimation of correlation coefficients, statistical significance, Testing of hypotheses with Two variable & Multiple Variable Regressions analysis **10 Hours**

**Unit 2: Violations of Classical Assumptions:** Examples on Multi-collinearity, Heteroscedasticity; Auto-correlation; measurement errors, omitted variables **10 Hours**

**Unit 3: Discrete Response Models**  
Estimation of models with binary variables, Linear probability models and demonstration of their limitations, Examples and exercises on Probit and Logit models **10 Hours**

**Total Hours: 30**

### Textbooks

1. Gujarati, Damodar N and Porter, Dawn C. Basic Econometrics. Fifth Edition, Hardcover. McGraw Hill Education, October 8, 2008
2. Christopher Dougherty. Introduction to Econometrics. Fourth Edition, Paperback. Oxford University Press, September 28, 2011
3. Greene, William H. Econometric Analysis. Eighth edition, Paperback. Pearson Education, 8 May 2018.

## R Programming

Course Category	L	T	P	C
SEC	1	0	2	2

### Detailed Syllabus

**Unit 1:** Introduction to R Programming – vectors – control statements – functions in R – matrices – Strings – Lists – Arrays in R – R factors

**15 Hours**

**Unit 2:** Data Frames in R – Data exploration and data cleaning - Data visualization with R – StringR, dplyR libraries, Practice Exercises and Assignments.

**15 Hours**

**Unit 3:** Application of Regression analysis- Principal Component Analysis- and Case Studies.

**15 Hours**

**Total Hours: 45**

### Textbooks

1. Kabacoff, Robert. R in action: Data analysis and graphics with R and Tidyverse. Simon and Schuster, 2022.
2. Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Golemund. R for data science. " O'Reilly Media, Inc.", 2023.
3. Wickham, Hadley. Advanced R. chapman and hall/CRC, 2019.

## Semester IV

### Development Economics

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Syllabus

#### Unit I: Development and Underdevelopment

Development Economics: Introduction, Alternative Measures and Indicators of Development: Economic Growth, Economic Development and Structural Changes, PQLI, HDI and its extensions, Development and growth- income as a measure of growth - Human development- Sens capability approach, development as freedom, Structural features of underdeveloped economies- International variations – development gap Underdevelopment as a low level equilibrium in a multiple equilibrium situation – low level equilibrium trap **15 Hours**

#### Unit 2: Models of Growth and Development:

Neoclassical Growth and Endogenous growth models, Productivity and Growth Linkages, Determinants of growth; Big Push, Balanced and Unbalanced Growth, Dual Economy Models- Lewis Model, Harris-Todaro Migration Model. **20 Hours**

#### Unit 3: Poverty and Inequality

Poverty and inequalities: Conceptual Underpinnings, Indicators of poverty, measurement of poverty and inequalities; characteristics of the poor; mechanisms that generate poverty traps, and path dependence of growth processes-Vicious circle of poverty, Kuznets curve. **15 Hours**

#### Unit 4: MDGs and SDGs

Cross Country Differences in Development Paths and New Development Challenges- Millennium Development Goals Sustainable Development Goals **10 Hours**

**Total Hours: 60 including tutorials**

### Text Books

1. Basu, Kaushik. Analytical Development Economics: The Less Developed Economy Revisited. United Kingdom: MIT Press, 2003.
2. Ray, Debraj. Development economics. 1<sup>st</sup> Edition, Hardcover. United Kingdom: Princeton University Press, 6 March 1998.

## Introduction to Machine Learning Techniques

Course Category	L	T	P	C
MC	3	0	2	4

### Detailed Syllabus

#### Unit 1: Machine Learning Basics 12 Hours

Introduction to Machine Learning (ML) - Essential concepts of ML – Types of learning – Machine learning methods based on Time – Dimensionality – Linearity and Non linearity – Early trends in Machine learning – Data Understanding Representation and visualization.

#### Unit 2: Machine Learning Methods 12 Hours

Linear methods – Regression -Classification –Perceptron and Neural networks – Decision trees – Support vector machines – Probabilistic models —Unsupervised learning – Featurization

#### Unit 3: Machine Learning In Practice 12 Hours

Ranking – Recommendation System - Designing and Tuning model pipelines- Performance measurement – Azure Machine Learning – Open-source Machine Learning libraries – Amazon’s Machine Learning Tool Kit: Sagemaker

#### Unit 4: Machine Learning And Data Analytics 12 Hours

Machine Learning for Predictive Data Analytics – Data to Insights to Decisions – Data Exploration – Information based Learning – Similarity based learning – Probability based learning – Error based learning – Evaluation – The art of Machine learning to Predictive Data Analytics.

#### Unit 5: Applications of Machine Learning 12 Hours

Image Recognition – Speech Recognition – Email spam and Malware Filtering – Online fraud detection – Medical Diagnosis.

**Total Hours: 60**

### TEXTBOOKS

1. Joshi, Ameet V. Machine Learning and Artificial Intelligence. Second Edition, Hardcover. Switzerland: Springer International Publishing, 2022.

2. Kelleher, John D., Mac Namee, Brian and D'Arcy, Aoife. Fundamentals of Machine Learning for Predictive Data Analytics, Algorithms, Worked Examples, and Case Studies. Second Edition, Hardcover. United Kingdom: MIT Press, 20 October 2020.

### REFERENCES

1. Bishop, Christopher M. Pattern Recognition and Machine Learning. Softcover reprint of the original 1st ed. 2006 Edition, Paperback. Switzerland: Springer New York, 23 August 2016.
2. Russell, Stuart Jonathan and Norvig, Peter. Artificial Intelligence: A Modern Approach. 4th edition, Paperback. Pearson Education, 31 May 2022.
3. Mueller, John Paul and Massaron, Luca. Machine Learning for Dummies. 2<sup>nd</sup> Edition, Paperback. United Kingdom: Wiley, 2021.

## Behavioural Economics

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Contents of Syllabus

**Unit 1:** Introduction- Nature and evolution of Behavioral Economics, Distinction between the Behavioral Economic Model and the Standard Economic model, Shortcomings of the SEM, Evaluating Behavioral theories, Applications of the BEM **10 hours**

**Unit 2:** Preferences, Choices and Utility - The Standard Economic model and its weaknesses, Nature of utility, Measurement of utility, Choice under certainty, An expected Psychological utility model, Policy implications **10 hours**

**Unit 3:** Heuristics and Biases - The Standard model, Bayesian Probability estimation and deviations, Self-evaluation bias, Projection bias, Magical Beliefs, Irrationality and causes **10 hours**

**Unit 4:** Decision Making under Risk and Uncertainty - Expected Utility theory and anomalies in EUT, Prospect theory, Reference points, Loss Aversion, Shape of the utility function, Decision weighting **10 hours**

**Unit 5:** Mental Accounting - Nature and components of mental accounting, Framing and editing, Budgeting and fungibility, Choice bracketing and dynamics, Policy implications **10 hours**

**Unit 6:** Social Preferences - The Standard model and anomalies, The nature of social preferences, Factors affecting social preferences, Modelling social preferences, Inequality aversion models, Reciprocity models, Policy implications **10 hours**

**Total – 60 hours including tutorials**

### Textbooks:

Williamson, Nick and Klaes, Matthias, An Introduction to Behavioural Economics, Palgrave Macmillan, 2012  
Cartwright, Edward, Behavioural Economics, Routledge, 2011

### Additional Readings:

1. Kahneman Daniel, **Thinking Fast and Slow**, Farrar Straus and Giroux, 2011
2. Ariely, Dan, **Predictably Irrational**, Harper Collins, 2009
3. Thaler, Richard, and Sunstein Cass, R. **Nudge**, Allen Lane, 2021

## Academic Writing

Course Category	L	T	P	C
SEC	0	2	0	2

### Detailed Syllabus

**Unit 1:** Features of Academic Writing – Audience, Purpose, Style

**Unit 2:** Preliminary Aspects – Writing Definitions, Process Description, Passive Voice, Writing about Cause and Effect

**Unit 3:** Interpreting Data and writing about it – Charts, graphs and other patterns of data.

**Unit 4:** Summarizing, Paraphrasing and Quoting, and aspects of Ethics and acknowledgment.

**Unit 5:** Reviewing and Evaluating Primary and Secondary Sources (Books, Journal articles, other sources)

**Unit 6:** The Process of Writing: CODER

**Total Hours: 30 hours (Each unit 5 lectures)**

### Textbook

- Swales, John M., Feak, Christine B. Academic Writing for Graduate Students: Essential Tasks and Skills (Michigan Series in English for Academic & Professional Purposes). 3rd edition, Paperback. United States: University of Michigan Press, 30 July 2012.

## **Semester V**

### **Indian Economy: An Analytical Perspective**

<b>Course Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
MC	3	1	0	4

#### **Detailed Syllabus**

##### **Unit 1: Economic Development since Independence**

A Brief overview of the Indian Economy on the Eve of Independence, An overview of planning in India, India's development strategy, economic liberalisation, growth trajectory in different phases **15 Hours**

##### **Unit 2: Major Sectors and Structural Change**

Overall Growth and Sectoral Performance of the Indian Economy: structural change and productivity, Issues pertaining to agricultural growth; Agricultural Commodity Markets, Contract Farming, WTO and Agriculture; manufacturing growth and issues relating to productivity; services-led growth in India. Savings and Investment in the Indian Economy. **15 Hours**

##### **Unit 3: Demographic characteristics, health and education**

Demographic changes in India, Demographic dividend, status of health and education in India's population, debates on approach to health and education policy **10 Hours**

##### **Unit 4: Distributional aspects of growth**

Employment, Poverty and Inequality in India – Measurement issues, Regional and sectoral dimensions of employment, poverty and inequality, Recent debates on poverty and employment during reforms, Issues relating to rural employment, livelihood security and MNREGA. **10 Hours**

##### **Unit 5: Macroeconomic Policy in India**

Fiscal Policy in India: Tax and non-Tax Revenue trends in India, issues pertaining to fiscal deficits, Public debt sustainability, fiscal reforms and State finances, FRBM Act, GST-Concept and issues. Monetary Policy in India: evolution and current framework, inflation and inflation targeting Trade and Balance of Payments in India: Merchandise trade performance and determinants, Dimensions of Services Trade, Exchange rate arrangements, Capital Flows and

their impact, Balance of Payments and issues related to Accumulation of Foreign Exchange Reserves, Capital Account Convertibility, external sector reforms in India, India and WTO India's Financial Sector- An overview, Financial Sector Reforms in India – Issues relating to reforms in banking, insurance, pensions, capital market. Issues relating to Infrastructure in the Indian economy: Financing-private vs state, case studies on selected provision of infrastructure, e.g., roads, energy, railways, ports, irrigation, sanitation and water supply and their impact on development.

**10 Hours**

**Total Hours: 60 including tutorials**

## **Textbooks**

1. Bhagwati, J., Panagariya, A. (2012). India's tryst with destiny, Collins Business.
2. Dreze, J., Sen, A. (2013). India: An uncertain glory. Allen Lane.
3. Joshi, V. (2016). India's long road: The search for prosperity. Allen Lane.
4. Kapila, Uma. Indian Economy Since Independence. 33rd Edition (2022-23), Paperback. India: Academic Foundation, New Delhi, 2 January 2022.
5. Kapila, Uma. Indian Economy: Performance and Policies. 23<sup>rd</sup> Edition, Paperback. India: Academic Foundation, New Delhi, 2 January 2022.
6. Muralidharan, K. (2024). *Accelerating India's Development: A State-Led Roadmap for Effective Governance*. Penguin Random House India Private Limited.

## **Datasets and Sources:**

1. National Accounts Statistics - MOSPI
2. Handbook of Statistics on the Indian Economy: Reserve Bank of India

## **Reports:**

1. Centre for Sustainable Employment. (2013). State of working India 2018. Azim Premji University.
2. India Development Reports - IGIDR

## History of Economic Thought

Course Category	L	T	P	C
MC	2	0	0	2

### Detailed Syllabus

#### Unit I: Classical and Neo Classical Economics (12 Hours)

The concept of Wealth of Nations, Division of Labour, Theory of Value, Division of labour, capital accumulation, distribution, trade and development; Ricardian Theory of Rent; Malthusian Theory of Population; Concept of Stationary State. Johns Stuart Mill- ideas on value, distribution, views as a synthesizer. Marginalist Revolution: Contributions of Alfred Marshall, Joan Robinson: critique of marginalism.

#### Unit II: Marxism (5 Hours)

Tenets of Marxian Thought-Theory of Surplus Value  
Capitalist Exploitation -Organizational Components -Class Struggle-Scientific Socialism-  
theory of profit, crisis of capitalism

#### Unit III: Keynesian Economic Thought (7 Hours)

Market failure; involuntary unemployment; The role of State vs Market; Fiscal Policy as a tool for growth promotion.

#### Unit IV: Institutionalism in Economic Thought (6 hours)

Industrial and Pecuniary employments in Thorstein Veblen; labour as an overhead cost: competition and Knowledge – perfect, imperfect and Rivalrous.

**Total hours - 30**

### Text Book

1. Hunt and Lautzenheiser, History of Economic Thought, Routledge, 3rd Edition (or Latest Edition)
2. Roncaglia, Alexander (2017): A Brief History of Economic Thought, Cambridge University Press.
3. Kurz D. Heinz, Economic Thought: A Brief History, Columbia University Press, 2016 (or Latest Edition)
4. Gide, Charles and Rist, Charles (1973): A History of Economic Doctrines, Oxford University Press.
5. Robert L Heilbroner (2000): Worldly Philosophers, Penguin Books.

### Additional Readings

1. A. Roncaglia, 'Why Should Economists Study the History of Economic Thought?', European Journal of the History of Economic Thought, 1996.
2. T. Aspromourgos, 'Why History of Economics?', History of Economics Review, 2017.
3. Robert Dorfman, 'Thomas Robert Malthus and David Ricardo', The Journal of Economic Perspectives, 1989.

## International Economics

Course Category	L	T	P	C
MC	3	1	0	4

### Detailed Contents of Syllabus

#### Unit 1: Introduction

Difference between internal and international trade, An overview of global trade, trend, and composition of global trade in goods and services, Capital inflows and their importance in global finance. **15 Hours**

#### Unit 2: International Trade and Competitiveness

Trade Theories and Comparative Advantage, New Trade Theories; Competitiveness, Outsourcing and Multinational Enterprises, WTO and International Trade. **15 Hours**

#### Unit 3: Trade Analytics and Policy

Instruments of trade policy, regional integration-free trade area and customs unions; political economy of trade policy; controversies in trade policy, Trade policy and WTO, WTO and Trade Disputes, Introduction to Trade Databases; Trade Data: Comparability Issues; Trade Openness Index; Trade Concentration (Hirschman Index); Trade Complementarity Index; Export Similarity Index; Revealed Comparative Advantage (RCA); Intra-Industry Trade Index (Grubel-Lloyd Index). **15 Hours**

#### Unit 4: International Finance

International Monetary Systems, Exchange Rate Systems and arrangements, Fixed, flexible and hybrid systems exchange rates; adjustment and financing of deficits in fixed and flexible exchange rate regimes, financial globalization and financial crises. IMF and the World Bank **15 Hours**

**Total – 60 hours including tutorials**

### Textbook

1. Salvatore, Dominick, and Sharma, Chandan. International Economics (An Indian Adaptation). 13th edition, Wiley, 2021.

### Suggested Readings

1. Krugman, Paul R., Obstfeld, Maurice and Melitz, Marc J. International Economics: Theory & Policy. Tenth edition, Paperback. Pearson Education, 1 December 2017.
2. Relevant Reports on Trade Policy and International Finance from IMF, World Bank, UNCTAD, WTO and RBI
3. Trade Database using Trade Map / UN COMTRADE

## Financial Literacy

Course Category	L	T	P	C
AEC	0	0	4	2

### Detailed Contents of Syllabus

#### Unit 1: Managing your Finances

8 Hours

Currency System in India; National Payments Corporation of India; Managing Income and Expenditure; Saving vs Investment; Impact of Inflation; Investment Options and Risk Associated; Factors Affecting Investment Returns; Investment Strategies; Loans & Collateral; Loans Advantages and Disadvantages; Loan Providers; Burden of Debt; Debt Management Ratios; Improving Credit Score

#### Unit 2: Financial Planning

8 Hours

Procrastination and Parkinson's Law; Long Term vs Short term goals; Strategies for Long Term Planning; Introduction to Financial Planning; Importance of Budgeting and Savings; Savings Ratio; Budgeting Exercise; Retirement Planning; Retirement Planning Assumptions; Accumulating Retirement Corpus

#### Unit 3: Risk and Reward

8 Hours

An Overview of Risk; Financial Products and Associated Risks; External Risks; Risk Appetite and Risk Capacity; Pure Risk vs Financial Risk; Financial Safety Nets and Insurance; Types of Insurance; Buying Insurance Products; Government insurance Schemes; Balancing Risk and Reward; Risk - Ignore, Avoid or Manage; Risk Management Strategies

#### Unit 4: Financial Landscape

6 Hours

The Business Cycle; Regulation and Consumer Protection; Financial Services Regulators in India; Consumer Rights; Unregulated Entities; Selecting Financial Services Providers; Education, Information and Advice – Rights and Responsibilities; Financially Literate; Financial Products and Services – Taxes and Public Spending; Life Stages and Suitable Financial Products; Scams and Frauds; Social Media and Online – Financial Scams; Online Data Security

**Total hours - 30**

#### Reading Materials

Financial literacy Course for Bharat by National Institute of Securities Markets (NISM)

## **Semester VI**

### **Corporate Governance and Business Ethics**

<b>Course Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
AEC	3	0	0	3

### **Detailed Contents of Syllabus**

#### **Unit 1: Corporate Governance**

**15 Hours**

Corporate Governance—Concept; Objectives; Need; Importance; Role played by Regulators in maintaining Corporate Governance; Theories of Corporate Governance; Stockholder versus stakeholder; Stakeholder approach and ethical reasoning; Elements of Corporate Governance; Whistle-blowing: Types and Need for Whistle-blowing.

#### **Unit 2: Introduction to Business Ethics**

**15 Hours**

Concept & Nature of Ethics; Levels of ethical reasoning and moral decision making; Relationship between Ethics and Law; The importance of ethics in business; Arguments in favour of and against Business Ethics; Ethical Dilemma & Decision-making; Theories of Ethics: Theory of Utilitarianism; Ethics of Rights; Ethics of Justice; Virtue Ethics; Social Contract Theory

#### **Unit 3: Corporate Social Responsibility**

**15 Hours**

Business ethics, governance and accountability; Social responsibilities of business towards Stakeholders (Internal & External); Corporate Philanthropy—Concept; Corporate Philanthropy vs CSR; Managing corporate social responsibility in the marketplace and with external stakeholders; Managing and balancing corporate governance, compliance and regulations; Provisions of the Companies Act regarding CSR Expenditure

**Total hours - 45**

#### **Textbooks**

1. Solomon, Hill. (2013). Corporate governance and accountability, John Wiley and Sons Limited (latest edition).
2. Weiss, J.W. (2014). Business Ethics: A stakeholder and issues management approach, Berett-Koehler Publisher (latest edition).
3. Shaw, William H. (2011). Business Ethics, Cengage Learning (latest edition).
4. Griseri, Paul; Seppala, Nina. (2010). Business ethics and corporate social responsibilities, Cengage Learning (latest edition).

## Minor Stream 1 (Sustainable Development and Public Policy)

### Public Economics and Policy

Course Category	L	T	P	C
MS	3	0	0	3

#### Detailed Syllabus

#### Unit 1: Normative Approach to Public Finance 12 Hours

Welfare Economics-Pure Exchange Economy and Economy with Production- The Fundamental Theorem of Welfare Economics; Choosing among Pareto Efficient Points

#### Unit 2: Market Failure and Public Goods 8 Hours

Types of market failure- Public Goods-Samuelson's theory-Lindahl Model of Pareto Optimality- Free rider problem- Efficient provision of Public Goods-Externalities- Introduction to Public Choice

#### Unit 3: Principles of Taxation and Grant Theory 10 Hours

Benefit approach, Ability to Pay Principle-Progressive Taxation-Excess Burden-Direct vs. Indirect Taxes-Theory of Tax Incidence-Theory of Grant

#### Unit 4: Deficit Financing and Public Debt 8 Hours

Deficit financing-measures of deficit and their relation with public debt-causes and sources of public debt-consequences of high level debt-debt sustainability-solvency conditions-debt dynamics- relation between debt and growth-Ricardian view, Keynesian view and neo-classical view.

#### Unit 5: Indian Fiscal System 7 Hours

Constitutional Assignment of Tax powers and Expenditure Responsibilities to Union and States- Transfers Mechanism-Composition and Trends in Central and States Receipts and Expenditures-Fiscal issues in India and Tax Reforms-Deficits and Public Debt- FRBM Act

**Total Hours: 45**

#### Textbooks

1. Hillman, Arye L. Public Finance and Public Policy: A Political Economy Perspective on the Responsibilities and Limitations of Government. 3rd edition, Paperback. India: Cambridge University Press, January 10, 2019.
2. Jha, Raghendra. Modern Theory of Public Finance. Paperback. India: New Age International Pvt. Ltd., 1 January 2019.
3. Musgrave, Richard A and Musgrave, Peggy B. Public Finance in Theory and Practice. 5th edition, Paperback. McGraw-Hill Education, 1 July 2017.
4. Hindriks, Jean and Myles, Gareth D. Intermediate Public Economics, Second Edition, Hardcover. United Kingdom: MIT Press, 2013.
5. Rosen, Harvey S and Gayer, Ted. Public Finance. 9<sup>th</sup> Edition, Paperback. McGraw-Hill Higher Education, 16 December 2009.
6. Stiglitz, Joseph E. Economics of the Public Sector, Third Edition, Hardcover. W.W. Norton & Company, 29 February 2000.

## Environmental Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

**Unit 1: Economic approaches to environmental problems:** Linkages between Economics and Environment, Macro aspects in environmental planning: sustainable development, economy and ecology, green/natural resource accounting, System of Economic and Environmental accounting. **8 Hours**

**Unit 2: Micro foundations of environmental economics:** Externalities and market failure, Baumol's Standards and Charges Approach, Pigouvian Taxes, Social and private costs. **8 Hours**

**Unit 3: Alternative Policy Instruments,** Command and Control vs. Market Based Instruments, Direct and Indirect Economic Instruments, Coase theorem and International Experience. **8 Hours**

**Unit 4: Natural resource management:** Exhaustible, renewable, common property resources, Coase Theorem and Institutional approach to environmental problems **8 Hours**

**Unit 5: Valuation of Natural Resources:** Direct and Indirect Methods, Environmental impact assessment. **8 Hours**

**Unit 6: Environmental issues in the Global Context:** GHG and Ozone Depletion, International protocols, global trade and Environmental standards and WTO. Pollution Control in India **5 Hours**

**Total Hours: 45**

### Texts/References:

1. Bhattacharya, Rabindra N. Environmental Economics: An Indian Perspective. Paperback. India: Oxford University Press, 12 June 2002.
2. Conrad, Jon M. Resource Economics. 2nd Edition, Hardcover. USA: Cambridge University Press, 14 June 2010. (Chapters 1, 2 and 5)
3. Hanley, Nick., Shogren, Jason F and White, Benedict. Environmental economics in Theory and Practice. Second Edition, Paperback. Palgrave Macmillan, 10 November 2006.
4. Kolstad, Charles D. Environmental Economics. 2<sup>nd</sup> Edition, Hardcover. USA: Oxford University Press, 31 March 2010.
5. Cropper, Maureen L., and Wallace E. Oates. "Environmental Economics: A Survey." Journal of Economic Literature 30, no. 2 (1992): 675–740. <http://www.jstor.org/stable/2727701>.
6. Sankar, Ulaganathan. Environmental Economics. Paperback. India: Oxford University Press, 24 October 2001.
7. Siebert, Horst. Economics of the Environment: Theory and Policy. Softcover reprint of hardcover 7th ed. (2008 edition). Springer-Verlag Berlin and Heidelberg GmbH & Co. K, 19 October 2010

## Global Political Economy

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

**Unit 1: Introduction and Overview of GPE:** The context of GPE and its relevance

**5 Hours**

**Unit 2: Managing the Global Economy:** Global Economic Relations Before World War II, The Mercantilist Era; The Industrial Revolution, The British Hegemony and its decline; • World Wars and the Interwar Period, Institutional Frameworks: Multilateral Institutions, the IMF, World Bank, GATT, OECD, United Nations, North-South relations, Group formation of countries G5, G7, G8, G10, G20, G24, G77; Centrally Planned Economies, Non-state Actors, The 2008 Global Financial Crisis

**10 Hours**

**Unit 3: Theoretical Perspectives on GPE:** The Realist Perspective; The Liberal Perspective and the Critical Perspectives: The role of individual, State and societal groups; Theoretical perspectives on GPE and the linkages between economics and politics

**10 Hours**

**Unit 4: The Issues in GPE:** International Monetary Relations; Global Trade Relations; Regionalism and the Global Trade Regime; Multinational Corporations and Global Production; International Development; Foreign Debt and Financial Crises

**10 Hours**

**Unit 5: Current Trends in the Global Political Economy:**

Globalization and Triadization; Globalization and the State; Globalization Inequality, and Poverty Globalization and Democracy; Globalization and Civil Society; Globalization and “Newer Issues”: The Environment, International Migration, and Illegal Activity; The Role of International Institutions; North–South Relations and the Changing Concepts of Development

**10 Hours**

**Total Hours: 45**

### Texts/References:

1. Balaam, David N and Dillman, Bradford. Introduction to International Political Economy. Seventh Edition, Paperback. United Kingdom: Routledge, 14 August 2018.
2. Cohn, Theodore H and Hira, Anil. Global Political Economy: Theory and Practice. 8<sup>th</sup> Edition, Paperback. New York: Routledge, 2020.
3. Gilpin, Robert G. Global Political Economy: Understanding the International Economic Order. Paperback. Princeton University Press, 2001.
4. O'Brien, Robert and Williams, Marc. Global Political Economy: Evolution and Dynamics. 6<sup>th</sup> Edition, Paperback. India: Bloomsbury Academic, 3 April 2020.
5. Oatley, Thomas H. International Political Economy. 7<sup>th</sup> Edition, International Student Edition, Paperback. Routledge, 15 November 2022.

## Law and Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

#### Unit 1: Introduction

5 Hours

Positive and Normative aspects of law and economics, Legal Traditions: Civil and Common Law, Law and economics: efficiency criteria in welfare economics; Coase theorem; prisoners' dilemma. Theories of justice of Rawls, Nozick, Dworkin, Sen & Nussbaum.

#### Unit 2: Economics of Tort Law

10 Hours

Different liability rules, efficiency analysis of liability rules, Unilateral and bilateral model of care, product liability, efficiency compensation trade off.

#### Unit 3: Economics of Property Law

10 Hours

Evolution of property rights, Property rights and their role in resource allocation; Coase theorem; Legal remedies for breach of property rights and their economic effects, Eminent Domain (Market and non-market mechanism for land transfer), Remedies for the violation of property rights; Intellectual Property Rights (IPRs): patents, copyright and trademarks. Cost and benefits of private IPRs; individual rights vs. common good.

#### Unit 4: Economics of Contract Law

10 Hours

Contracts; role of contracts for the functioning of markets; efficient contracts; damages measure and their efficiency properties; Contracts for provisions of public goods: procurement contracts; government provisions vs. public-private partnerships; cost-quality trade-off.

#### Unit 5: Economics of Criminal Law

10 Hours

Crime Production Possibility-Demand and Supply, Demand for Crime & Supply of Crime Concept of Market and Crime Market; Criminal law versus tort law; Traditional theory of criminal law, economic theory of criminal law.

**Total Hours: 45**

### References

1. Cooter, Robert., Ulen, Thomas. Law and Economics. 6<sup>th</sup> edition. Pearson New International Edition, Paperback. Pearson Education Limited, 8 August 2013.
2. Hart, Oliver. Incomplete Contracts and Public Ownership: Remarks, and an Application to Public-Private Partnerships. The Economic Journal 113, no. 486 (2003): C69–76. <http://www.jstor.org/stable/3590047>.
3. Miceli, Thomas J. The Economic Theory of Eminent Domain: Private Property, Public Use. Illustrated edition, Paperback. United Kingdom: Cambridge University Press, 20 June 2011.

## Labour Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

#### Unit I: Introduction

12 Hours

Actors in the labour market, labour supply, measuring the labour force, the worker's preference: Utility and indifference curve analysis, Budget constraint, hours of work decision, labour supply curve and elasticity, and discussion on empirical studies, problems with estimated elasticities, labour supply over life cycle, labour supply over the business cycle.

#### Unit 2: Labour Demand and labour market equilibrium

12 Hours

Production function, profit maximization, employment decision in the short-run, employment decision in the long-run, long-run demand curve for labour, elasticity of substitution, policy application: affirmative action and production costs, Marshall's rule of derived demand, factor demand with many inputs, labour market equilibrium.

#### Unit 3: Human Capital and the wage structure

12 Hours

Education in labour market, Present value, the schooling model, Education and earning, estimation of returns to schooling, policy applications

#### Unit 4: Labour Mobility and Labour Market Discrimination

9 Hours

Geographic migration as investment, internal migration, return and repeat migration, family migration, Effect of immigration, race and gender in labour market, the discrimination coefficients, employer discrimination, employee discrimination, customer discrimination, statistical discrimination, experimental evidence, measuring discrimination, policy applications.

**Total Hours: 45**

### Text Books:

1. Borjas, George J. Labor Economics. 5<sup>th</sup> Edition, Paperback. McGraw-Hill/Irwin, 2010.
2. Ahsan, Ahmad, Pages, Carmen and Roy, Tirthankar. Legislation, enforcement and adjudication in Indian Labor markets: origins, consequences and the way forward. In: Mazumdar, Dipak and Sarkar, Sandip, (eds.) Globalization, Labor Markets and Inequality in India. Routledge studies in the growth economies of Asia (79). Routledge, London, UK, pp. 247-282 (2008). ISBN 9780415436113.

### References:

1. Cahuc, Pierre., Carcillo, Stéphane., Zylberberg, André. Labor Economics. 2<sup>nd</sup> edition, Hardcover. United Kingdom: MIT Press, August 1, 2014.
2. Bazen, Stephen. Econometric Methods for Labour Economics. 1<sup>st</sup> Edition, Hardcover. United Kingdom: OUP Oxford, 1 September 2011.
3. Ehrenberg, Ronald G., Smith, Robert Stewart and Hallock, Kevin F. A Modern Labor Economics: Theory and Public Policy. 14<sup>th</sup> Edition, International Student Edition, Paperback. United Kingdom: Routledge, 15 November 2021.
4. Datt, Gaurav. Bargaining Power, Wages and Employment: An Analysis of Agricultural Labor Markets in India. 1<sup>st</sup> Edition, Hardcover. India: SAGE Publications, 1996.

## Advanced Econometrics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit 1: Introduction of Time Series

**10 Hours**

Introduction: Examples, simple descriptive techniques, trend, seasonality, the correlogram. Stochastic Process: Introduction and Stationary Process. Introduction to time series data, application of time series from various fields. Modelling time series as deterministic function plus IID Errors-Characteristics of Time Series Data Model identification/estimation/linear operators. Practice sessions

#### Unit 2: AR, MA ARMA Models and Forecasting

**15 Hours**

Basic models of Time Series Data -Probability models for time series: stationarity. Detrending and De-seasonalizing-Box-Jenkins modelling; Moving-average (MA) process and Autoregressive (AR) process of orders one and two. ACF and its graphical use in guessing the order of MA processes. Estimation of the parameters of AR (1) and AR (2) using least square and Yule-Walker equations. Basics of ARIMA models; ACF and PACF- Estimation & Forecasting - Estimating the autocorrelation function and fitting ARIMA models. Forecasting: Exponential smoothing, Forecasting from ARIMA models. Practice sessions

#### Unit 3: Panel Data Estimation

**15 Hours**

Definition of panel data- representation of balanced-panel and unbalanced panel models- Pooled OLS Model-Panel data and pooled OLS model -The fixed effects model -The random-effects model - Further topics in the analysis of linear panel data models Practice sessions

#### Unit 4: First Difference Estimator

**5 Hours**

First difference estimator, random effects model, time fixed effects, Tests of hypothesis for pooled or fixed effects model, pooled and or random effects models (Breusch-Pagan Lagrange Multiplier Test) and fixed or random effects (Hausman test- Practice sessions

**Total Hours: 45**

### References

1. Wooldridge, J. M. (2016). *Introductory Econometrics: A Modern Approach 6rd ed.* Cengage learning.
2. Cameron, A. Colin., Trivedi, Pravin K. *Microconometrics: Methods and Applications.* Hardcover. United States: Cambridge University Press, 9 May 2005.
3. Cameron, A. Colin., Trivedi, Pravin K. *Microeconometrics Using Stata.* Revised Edition, Paperback. Iran: Stata Press, 9 March 2010.
4. Kohler, Ulrich and Kreuter, Frauke. *Data Analysis Using Stata, Third Edition* Paperback. United States: Stata Press, 20 August 2012.
5. Chatfield, Chris. *The Analysis of time series: An Introduction.* Sixth Edition, Paperback. T&F India, 1 January 2017.
6. Kendall, Maurice George., Ord, J. K. *Time Series (Charles Griffin Book).* 3rd edition, Paperback. Oxford University Press, August 9, 1990.
7. Brockwell, Peter J and Davis, Richard A. *Introduction to Time Series and Forecasting (Springer Texts in Statistics).* 3rd Edition, Paperback. Germany: Springer International Publishing, 2016.
8. Shumway, Robert H and Stoffer, David S. *Time Series Analysis and Its Applications: With R Examples.* Fourth Edition, Paperback. Germany: Springer International Publishing, 19 April 2017.

## Industrial Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Contents of Syllabus

#### Unit 1: Industrial Economics – Introduction

5 hours

Nature and Role of Industrial Economics. Theories of Firm- Behavioural Theory of the Firm, Managerial Theory of the Firm, Contestable Market theory of the Firm

#### Unit 2: Structural Analysis of Industry

15 hours

Oligopoly – collusive and non-collusive models; Concentration –measurements of concentration and interpretation, trends in concentration and location of industry; systematic determinants of seller concentration – horizontal and vertical mergers, random growth hypothesis; barriers to entry – classification, structural barriers, entry deterring strategies, potential entry & contestability, entry and industry evolution; market structure, firm strategy and performance: empirical tests of the SCP paradigm, strategic groups, concept of profitability and measurement, sources of variation in profitability- industry, corporate and business unit effect, New Empirical Industrial Organisation (NEIO).

#### Unit 3: Industrial Efficiency and Productivity -Concepts & Measurement

5 hours

Meaning, determinants, measurement of efficiency levels, efficiency conditions, efficiency and decision-making process.

#### Unit4: Analysis of Firm Strategy

20 hours

Pricing – cost plus pricing, price discrimination, peak-load pricing, transfer pricing; product differentiation-types, monopolistic competition-socially optimal amount of product differentiation, Lancaster's product characteristics model, hotelling's & Salop's location model, advertising – determinants of advertising expenditure, advertising & product characteristics, advertising & profit maximization, advertising & barriers to entry, advertising, information search & quality signalling; R & D: Market structure, firm size and the pace of technological change, Investment in research and development; Investment in research and development: Motives for vertical integration: enhancement of market power, motives for vertical integration, agency & vertical relationships, motives for and types of vertical restraints; diversification: types, motives, corporate coherence, corporate focus and de-conglomeration.

### Text Book:

1. Lipczynski, John., Wilson, John O. S and Goddard, John A. Industrial Organization: Competition, Strategy and Policy. 5th edition, Paperback. United Kingdom: Pearson Education Limited, 23 June 2017.
2. E-Learning Materials uploaded in LMS.

### Reference Books:

1. Pindyck, Robert and Rubinfeld, Daniel. Microeconomics (Eighth Edition), Pearson India, 2017.
2. Barthwal, R. R. Industrial Economics: An Introductory Textbook. Fourth Edition, Paperback. India: New Age International Private Limited, 1 August 2021.
4. Clarke, Roger. Industrial Economics. 1st edition, Paperback. Wiley-Blackwell, 12 September 1985.
5. Tirole, Jean. The Theory of Industrial Organization. PHI Learning Private Limited, Delhi, Indian Reprint, 1988.

## Impact Evaluation

Course Category	L	T	P	C
MS	3	0	0	3

## Detailed Syllabus

**Unit 1:** Methods and Practices: Introduction and Basic Issues of Evaluation - Monitoring vs Evaluation, Setting up indicators, Operational Evaluation, Quantitative vs qualitative impact assessments, Ex Post vs Ex Ante Impact Evaluations, Counterfactual, Selection Bias.

**5 Hours**

**Unit 2:** Randomization: Setting Counterfactual, Statistical Design, Calculating Treatment Effects, Different Methods of Randomization, Concerns with randomization, Randomized Impact Evaluation in Practice, Difficulties with randomization

**10 Hours**

**Unit 3:** Propensity Score Matching: PSM and its practical uses, PSM Method in theory, Application of PSM Method, Critiquing the PSM Method, PSM and Regression-Based Method

**10 Hours**

**Unit 4:** Double Difference: Addressing selection bias: using differences as counterfactual, Theory and applications of DD Method, Advantages and disadvantages of using DD, Alternative DD Models

**10 Hours**

**Unit 5:** Instrumental Variable Method and Regression Discontinuity Design: Testing of Endogeneity: OLS vs IV, IV Method using binary treatment, IV with fixed effects, Impact estimation using RD, Implementation of Sharp and Fuzzy Discontinuity

**10 Hours**

## Study Material

1. Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2009). *Handbook on impact evaluation: quantitative methods and practices*. World Bank Publications.
2. Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. (2016). *Impact evaluation in practice*. World Bank Publications.
3. Angrist, J. D., & Pischke, J. S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.

## Gender Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

#### Unit I: Fundamental Concepts of Gender Studies

8 Hours

Definition- Objectives and Importance of Gender Studies; Role of Women in Economic Development - Concept of engendering - Strategic Gender Needs - Practical Gender Needs – Liberal Feminism: Equality– Rationality - Freedom -Human Development Index – Methods of Activity at Gender Based Analysis – Gender Related Development Index - Gender Empowerment Measures – Mainstreaming Gender development policies – Paradigm shift from women wellbeing to Women’s Empowerment; Gender needs – practical and strategic.

#### Unit II: Gender Division of Labour

8 Hours

Concept of work – productive and reproductive - Invisibility of Women’s participation in work force- affecting and promoting the entry into the market - Women in organized and unorganized sector -SHG and Gender- Labor law relating to women - minimum wages act - Equal wages & Equal remuneration - Maternity benefit & child care – ESI - Sexual harassment at work place and visakha Judgement.

#### Unit III: Gender Division of Women’s Health

8 Hours

Health as a Gender Issue, Status of Women’s health in India, Maternal Morbidity, Maternal mortality, Infant Mortality, Life Expectancy, Fertility. Maternal and Child health Services in India, Food and nutrition, Anaemia, Pre-natal care, Factors Influencing Women’s Health. Menarche - Menstruation and Menstrual hygiene – menopause - Ailments related to pregnancy - Anemia and nutritional deficiency - issues and Gender Dimensions of Infertility - Contraception Prospects for improvement in reproductive health. Reproductive health, Mental health, Occupational health, Environmental health, Family planning, Impact of violence on women’s health. Health Care Needs of Women – Personal Hygiene.

#### Unit IV: Political Empowerment of Women

8 Hours

Political participation of women – Political Socialization- Women leaders in politics- Barriers- Reservation policies- Women’s Political Rights. Gender Budgeting- Gender and Local Governance- Gender Auditing – Gender sensitive approaches to development. Political Rights of Women in India - Electoral process - women as voters - candidates and leader - pressure group, Attitude of political parties towards women’s issues- Problems of women in political process- Reservation for women in political process. Committees and commissions on women’s participation in panchayat institutions.

#### Unit V: Poverty and Gender

8 Hours

Feminization of poverty– Female Poverty and Poverty alleviation programmes; Status of Women farmers and land rights; Women Entrepreneurs; Impact of Globalization on working women; National Policy for the empowerment of women. Dalit Women movement – Women Movement against Poverty and Violence (MAPOVT)- Women development and empowerment – Programmes Central and State Government - IRDP – DWACRA – SGSY – Shreeshakti, MGNREGA- Employment Generation Schemes - Approaches and Access to

Credit (from traditional form of credit to microcredit), Microfinance revolution - SHGs and Economic Empowerment.

**Unit VI: Social Issues Regarding Women and Third Gender**

**5 Hours**

Issues of Girl child, Female, infanticide and foeticide, Sex Ratio child marriage, Dowry & Property Rights, Violence against Women, Domestic violence, Female Headed Households', Women in the Unorganized sector of Employment, Women's work- Status and problems, problems of Dalit women-Issues of the rights of sexual minorities and transgender - Article 377 and beyond -Exploration and understanding of how COVID-19 has had gendered impacts. Lateral Thinking – Need for Creativity and innovation.

**Total: 45 Hours**

## **Texts/References:**

1. Jain, Devaki and Rajput, Pam. Narratives from the Women's Studies Family: Recreating Knowledge. First Edition, Paperback. India: Sage Publications, 30 March 2003.
2. Menon, Nivedita. Recovering Subversion: Feminist Politics beyond the Law. 1<sup>st</sup> Edition, Paperback. India: Orient Blackswan Private Limited - New Delhi, 1 January 2007.
3. Sangari, Kumkum and Vaid, Sudesh. Recasting Women: Essays in Colonial History. Paperback. India: Zubaan Books, 1 July 2013.
4. Lerner, Gerda. The Creation of Patriarchy. Reprint edition, Paperback. OUP USA, 18 February 1988.
5. Raj, Maithreyi Krishna. Women's Studies in India: Some Perspectives. Hardcover. India: Popular Prakashan, 1986.
6. Khullar, Mala. Writing the Women's Movement: A Reader. Paperback. India: Kali for Women, 2005.
7. Mies, Maria. Indian Women and Patriarchy. Hardcover. Humanities Pr, 1 November 1980.
8. Delamont, Sara. Feminist Sociology. Paperback. India: SAGE Publications, 2003.

## Health Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

**Unit 1: Introduction to Health and Healthcare** - Public health; community health and population health; Meaning of epidemiology; Incidence versus prevalence; Economic Epidemiology; Prevention (Education, Nutrition and Immunization)

**9 Hours**

**Unit 2: Introduction to Health Economics** - Disease, illness, sickness, and health • The nature of healthcare: need versus demand; Health accounts

**9 Hours**

**Unit 3: Demand and Supply of Health** - Demand for health and health care; Determinants of demand for health and healthcare; Determinants of supply of healthcare; Production functions of healthcare

**9 Hours**

**Unit 4: The Healthcare Market** - Characteristics of healthcare goods and services; Healthcare as a public good and private good; Positive and negative externalities in healthcare ; Market failure

**9 Hours**

**Unit 5: Health Insurance** - Theory of health insurance; The Demand for and Supply of Health insurance; Market failure in health insurance markets ; Payment and reimbursement mechanisms ;Managed care; National Health Insurance Fund/Scheme; Value-based purchasing.

**9 Hours**

**Total: 45 Hours**

### Textbooks

1. Bhattacharya, Jay., Hyde, Timothy and Tu, Peter. Health Economics. 2013th edition, Paperback. Palgrave Macmillan, 30 October 2013.
2. Folland, Sherman., Goodman, Allen Charles and Stano, Miron. The Economics of Health and Health Care. International Student Edition, 8th Edition, Paperback. Routledge, 25 May 2017.
3. McPake, Barbara., et.al. Health Economics: An International Perspective. 4<sup>th</sup> Edition, Paperback. United Kingdom: Routledge, 2020.
4. Zweifel, Peter., Breyer, Friedrich and Kifmann, Mathias. Health Economics. 2nd edition (2009 edition), Paperback. Germany: Springer Berlin Heidelberg, 14 November 2014.

## Urban Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Course Content:

#### Unit 1: Introduction and Overview: Economic forces and City formation

Market Forces in the Development of Cities, The Role of Comparative Advantage and Scale Economies, Agglomerative Economics in Production & other extensions, Spatial Orientation, Economies of localization and diversification, Zipf's Law

**15 Hours**

#### Unit 2: Land Rent and Land Use Patterns

Analysis of land as a factor of production and different theories of economic rent; the location of firms and households rent, Land Rent and Land Use Patterns, Neoclassical theory of Household Location and Bid Rent Gradients, Analysis and extensions of household locational choices, Mono centric Model, Theory of Residential Land Use

**10 Hours**

#### Unit 3: Urban Governance Structure and Urban Finance in India

Governance frameworks: 74th Constitutional Amendment Act – the policies and the infrastructure provision and the regulatory framework this implies. Initiatives from the government in the form of policy frameworks for various market and nonmarket forms/partnerships a. JNNURM – I Urban finance-models- and other innovative arrangements such as PPP growth models of the future in power, telecom, transport, commercial and urban infrastructure, and social infrastructure - Public Private Participation - best practices in these sectors with case studies from India.

**10 Hours**

#### Unit 4: Characteristics of Urban India

The fundamental problems of the city with respect to access to accommodation, health, water; Urban poverty- migration-livelihood-definition – Trends – Quality of Life indicators and assessment – the overarching policy paradigms – estimation of urban poverty-case studies.

**10 Hours**

**Total Hours: 45**

### Textbooks/References

1. Arthur O'Sullivan (2002), Urban Economics, 5th Edition, McGraw-Hill

2. Kundu, D., Sietchiping, R., & Kinyanjui, M. (2020). Developing national urban policies. Springer: Singapore.
3. Aijaz, R. (2007). Challenges for urban local governments in India.
4. Dahiya, B., & Das, A. (2020). *New urban agenda in Asia-Pacific: governance for sustainable and inclusive cities* (pp. 3-36). Springer Singapore.
5. Kundu, A., Rahaman, M., & Khan, K. (2024). Access of urban poor to basic services: concerns of sustainability and equity. *Social Change*, 54(1), 7-35.
6. Sivaramakrishnan, K. C., Singh, B. N., Kundu, Amitabh. Handbook of Urbanization in India. 2<sup>nd</sup> Edition, Paperback. India: OUP India, 25 June 2007.
7. Eisner, Simon., Gallion, Arthur., Eisner, Stanley. The Urban Pattern. 6<sup>th</sup> Edition, Paperback. Wiley, 1993.
8. Hutchinson, B. G. Principles of Urban Transport Systems Planning. Hardcover. McGraw-Hill Inc., US, 1974.
9. Bhargava, Gopal. Socio-Economic and Legal Implications of Urban Land Ceiling and Regulation. Hardcover. India: Abhinav Publications, 1983.
10. Roy, Manoj., Cawood, Sally., Hordijk, Michaela and Hulme, David. Urban Poverty and Climate Change: Life in the Slums of Asia, Africa and Latin America. 1<sup>st</sup> Edition, Paperback. Routledge, 2018.

## Reports:

1. Town and City Planning Organisation, GoI. <http://tcpo.gov.in/>
2. Smart City Mission Statement and Guidelines in Smart Cities Mission Guidelines. New Delhi, India: Ministry of Urban Development, Govt. of India, 2015.

## Agricultural Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit I: Agriculture and Economic Growth

5 Hours

Role of Agriculture in Economic Development, sectoral changes and agriculture, agriculture in rural development, farm and non-farm employment issues, inter-linkages between agriculture and other sectors; Schultz's hypothesis on traditional agriculture and its critique Mechanization of Indian Agriculture; Green revolution and its impacts

#### Unit II: Agricultural Marketing

15 Hours

Agricultural price policy for a developing economy—objectives and effectiveness of agricultural price policy; elements of agricultural price policy; features of an ideal agricultural price policy; agricultural price policy in India and public distribution system Agricultural marketing – need and criteria for assessing efficiency; agricultural marketing system in India; development of a national agricultural marketing platform—Role of Capital in Agriculture; Meaning; scope and significance – Factors determining demand for credit; Classification and sources of Agricultural Credit - Role of NABARD – Cooperation - Micro finance and SHGs – Capital formation in Agriculture - Crop Insurance

#### Unit III: Risk and Uncertainty in Agriculture

10 Hours

Difference between risk and uncertainty, types of uncertainty in agriculture, measures for mitigating risk and uncertainty in agriculture, new agricultural insurance scheme of India Rural credit in India, importance and estimates, agencies for rural credit, review of progress of institutional finance in rural India since independence

#### Unit IV: Agriculture in Indian Planning

15 Hours

Agriculture in Indian Planning, Globalization and Indian agriculture, Case for and against privatization of agriculture, WTO and India's trade in agricultural commodities – Agriculture price and food policy—Agriculture Prices Functions and Fluctuations; Cobb-Web Model; Need for Government intervention; Objectives of Price policy; Types of Agriculture Prices: Minimum Support Prices and Statutory Minimum Support Price, Procurement Prices; Fixation of Minimum Support Price; Terms of Trade and Agriculture; Food Security and Food Subsidy; Food Corporation of India and Buffer stock; Public Distribution System (PDS) in India: Procurement and Distribution; Critics of PDS - National Food Security Act—Contemporary issues of primary sector in India.

Total Hours: 45

## **Textbook**

1. Sony, R. N. Leading Issues in Agricultural Economics. 12<sup>th</sup> Edition, Paperback. Vishal Publishing Co, Jalandhar. 1 January 2015.

## **Reference Book:**

1. Amarjit Singh., Sadhu, A. N and Singh, Jasbir. Fundamentals of Agricultural Economics. Paperback. India: Himalaya Publishing House, 1 January 2015.
2. Acharya, S.S and Agarwal, N.L. Agricultural Marketing in India. 7th Edition, Paperback. CBS Publishers & Distributors, 28 February 2021.

## Regulatory Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus:

#### Unit 1: Economic theory behind Regulatory Economics:

Fundamental principles and tools in economic theory that govern the choice of policymakers – that determine the type and nature of regulation from economic standpoint

Social Choice theory: Pareto principle, utility possibility curve, efficiency types, welfare theorems in Economics, Social indifference curves

Public Choice theory: public choice which includes concepts like – Arrow’s impossibility theorem and median voter theorem **7 hours**

#### Unit 2: Regulation of Concentrated Markets

Anti-Trust Laws: Introduction, history and fundamental theory and trajectory, Antitrust in Indian context – Methodologies and cases of CCI - CCI document on history and evolution of antitrust regulation in India

Oligopoly and Collusion Monopolization (Market Dominance, Price manipulation, and its evaluation), Anti-trust for the new economy – Information and Communication Technology **15 hours**

#### Unit 3: Regulation of Natural Monopolies and Competitive Industries

Introduction to economic regulation: Instruments and theories of economic regulation, Public Enterprises and Franchise bidding/ Contract Regulation: A case study of Cable Television Industry, Dynamic Issues in Natural Monopoly Regulation: Telecommunications Sector Regulation of Potentially Competitive Markets: Theory and Estimation Methods, Regulation in different sectors like transportation etc. **15 hours**

#### Unit 4: Development and Regulation

Social and Environmental regulation, Concepts and themes in Social Cost Benefit Analysis, Alternative to mainstream view of regulation/regulatory state and critical perspectives including case studies discussion from India and other developing regions. **8 hours**

### Textbooks:

1. Stiglitz, Joseph E, and Jay Rosengard. 2015. “*Economics of the Public Sector*”, W.W. Norton & Company.
2. Viscusi, W. Kip & Harrington, Joseph E., Jr. & Sappington, David E. M., 2018. “*Economics of Regulation and Antitrust*”, fifth edition, MIT Press Books, The MIT Press, edition 5.
3. Dubash, Navroz K., and Bronwen Morgan (eds). 2013. *The Rise of the Regulatory State of the South: Infrastructure and Development in Emerging Economies*, Law And Global Governance. Oxford.
4. Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2018). *Cost-Benefit Analysis: Concepts and Practice* (5th ed.). Cambridge: Cambridge University Press.

## Data: Sources, Issue and Socio-Economic Analysis

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit 1: Importance of data

Assessment of policy outcomes vis-a-vis Policy objectives, Data sources: Government, Social Media, Private, etc. Data as a public good; personal data and the right to privacy; Awareness about sharing the data

**10 Hours**

#### Unit 2: Data collection and Reporting agencies:

Government and private sources, Levels of data: (i) Micro, meso and macro data; (ii) Global, Regional and Country specific data; Methodologies of data collection: Surveys, official records, etc.

**15 Hours**

#### Data collection, Compilation and Dissemination for the Indian Economy

Sr. No.	Description of Data	Data Compilation and Released by Ministries and Departments of Govt of India
1	Demographic Data, standard of living data	Census Data Office, Registrar General & Census Commissioner, India, Ministry of (Mo)Home Affairs
	National Income, Savings, Investment, Sectoral Incomes, State Domestic Product,	Mo Statistics and Programme Implementation
2	Health and family welfare indicators	National Family Health Survey reports, -NFHS-Series, Mo Health & Family Welfare
3	Education	Mo Education DISE data
4	Periodic Labour Force Survey (PLFS) data	Ministry of Statistics and Programme Implementation
5	Industrial Production	Official Industrial Data from Ministry -CMIE data bases, Ministry of Statistics and Programme Implementation
6	Agricultural, food availability data	Directorate of Economics & Statistics, Department of Agriculture and Farmers Welfare.
7	Financial Markets Data	SEBI, NSE, BSE
8	Monetary and Banking	RBI
9	Fiscal Sector	Mo Finance
10	Prices and Inflation	Labour Bureau and MoSPI
11	Industrial Sector	Annual Survey of Industries, NSSO
12	Poverty data	Niti Aayog, ARIS/REDS Data NCAER, EPW Research Foundation Data Bases

Note: 'Ministry of' abbreviated as 'Mo'. **Economic Survey** presented before the Annual Budget and **Handbook of Statistics on the Indian Economy**, constitute two major sources of data compiled from the various data collection agencies in India.

**Unit 3:** Global data sources: International Monetary Fund, World Economic Outlook, Food and Agricultural Organization, OECD, World Bank, World Trade Organization, United Nations, etc. **10 Hours**

**Unit 4:** Methods and Controversies-National Income Data in India, Qualitative Data and Analysis. **10 Hours**

**Total Hours: 45**

## **Web Resources**

- Government of India Website, RBI website, BSE and NSE Websites, SEBI Websites, etc.
- Websites for Global Data: IMF, WTO, World bank, FAO, etc

## Minor Stream 2 (Advanced Data Science)

### Data Processing: Wrangling and Visualisation

Course Category	L	T	P	C
MS	2	0	2	3

#### Detailed Syllabus

##### Unit 1: Toolboxes For Data Scientists 9 Hours

Introduction to Python; Fundamental Python Libraries for Data Scientists: NumPy – SciPy – ScikitLearn – Pandas – Matplotlib; IDE; Data Manipulation with Python - Introduction to Single variable: Distribution Variables - Numerical Summaries of Level and Spread - Scaling and Standardizing

##### Unit 2: Basics Of Data Visualization 9 Hours

The Seven Stages of Visualizing Data – Different types of charts – Intro to tableau – Connections and Correlations - Scatterplot Maps - Trees, Hierarchies- Acquiring Data – Parsing Data – Calculated fields in tableau.

##### Unit 3: Advance Data Visualization 9 Hours

Visualizing Geographic Data – Creating dashboards, Story boards and Animations – Level of Detail (LoD) calculations – Dual Axis charts in tableau – time series visualization.

##### Unit 4: Time Series, Text and Image Exploration 9 Hours

Introduction to Time series –Algorithms for handling time series– Introduction to text processing – Regular Expressions – Basic text processing – Introduction to Image data exploration.

##### Unit 5: Streamlit and Interactive Data Applications 9 Hours

Introduction to Streamlit- Installing and setting up Streamlit, building a basic app with a dataset: displaying data, tables, images, text, and plots outputs.

**Total Hours: 45**

#### References

1. McKinney, Wes. Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. " O'Reilly Media, Inc.", 2012.
2. Lorna Brown, Tableau Desktop Cookbook: Quick & Simple Recipes to Help You Navigate Tableau Desktop, " O'Reilly Media, Inc.", 2021.
3. Müller, Andreas C., and Sarah Guido. Introduction to machine learning with Python: a guide for data scientists. " O'Reilly Media, Inc.", 2016.
4. Nielsen, Aileen. Practical time series analysis: Prediction with statistics and machine learning. O'Reilly Media, 2019.
5. Tyler Richards, Streamlit for Data Science, Packt Publishing, 2023

## Big Data Analytics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit I: Introduction

9 Hours

Introduction to Intelligent data analysis: Nature of data - Modern Data analytics tools, Statistical concepts: Probability – Sampling – Statistical inference – Prediction & Prediction errors – Resampling.

#### Unit II: Statistical and Machine Learning Methods

9 Hours

Statistical Methods: Regression modelling – Classical Multi-Variant analysis, Bayesian Methods: Bayesian Inference – Modelling – Bayesian Network, SVM & Kernel Method: Overfitting & generalized bounds – SVM , Neural Network: Multi-layer feedforward – Learning & Generalization – Radial basic functions.

#### Unit III: Mining Data Streams

9 Hours

Introduction, Stream data model, Sampling data in a stream, Filtering streams, Counting distinct elements in a stream, Estimating moments, Counting oneness in a window, Decaying window.

#### Unit IV: Big Data Mining

9 Hours

Frequent Item Sets: Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream, Clustering Techniques: Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern-based clustering methods – Clustering in non-euclidean space – Clustering for streams and parallelism.

#### Unit V: Frameworks & Visualization

9 Hours

Frameworks: MapReduce – Hadoop Distributed file systems - NoSQL Databases, Visualization: Introduction - Classification of visual data analysis techniques - Data types to be visualized - Visualization techniques.

### Text books

1. Berthold, Michael R and Hand, David J. Intelligent Data Analysis: An Introduction. 2<sup>nd</sup> edition, Paperback. Germany: Springer-Verlag Berlin and Heidelberg GmbH & Co., 2010. (Unit I & II).
2. Leskovec, Jure., Rajaraman, Anand., Ullman, Jeffrey David. Mining of Massive Datasets. Third Edition, Hardcover. United Kingdom: Cambridge University Press, 2020. (Unit III, IV & V).

### References

1. Han, Jiawei., Pei, Jian., Tong, Hanghang. Data Mining: Concepts and Techniques. 4<sup>th</sup> Edition, Paperback. Netherlands: Elsevier Science, 2022.
2. Holmes, Dawn E. Big Data: A Very Short Introduction. Illustrated edition, Paperback. United Kingdom: Oxford University Press, 2017.
3. Hastie, Trevor., Tibshirani, Robert., Friedman, Jerome H. The Elements of Statistical Learning: Data Mining, Inference, and Prediction. 2nd Edition, Paperback. United States: Springer, 2009.
4. Pries, Kim H and Dunnigan, Robert. Big Data Analytics: A Practical Guide for Managers. First Edition. New York: Auerbach Publications, 2015.

## Data Mining

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### **MODULE 1: Data Warehousing, Business Analysis And On-Line Analytical Processing** **12 Hours**

Basic Concepts - Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors - Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies - Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

#### **MODULE 2: Data Mining – Introduction** **9 Hours**

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Pre-processing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

#### **MODULE 3: Data Mining - Frequent Pattern Analysis** **9 Hours**

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns - Mining associations in real time data sets using WEKA / R.

#### **MODULE 4: Classification** **9 Hours**

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Lazy Learners – Model Evaluation and Selection- Techniques to improve Classification Accuracy - Classification of real time data sets using WEKA / R.

#### **MODULE 5: Clustering** **9 Hours**

Clustering Techniques – Cluster analysis-Partitioning Methods - Hierarchical Methods – Density Based Methods - Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods - Clustering real time data sets using WEKA / R.

**Total Hours: 45**

### TEXTBOOKS

1. Han, Jiawei., Pei, Jian., Tong, Hanghang. Data Mining: Concepts and Techniques. 4th Edition, Paperback. Netherlands: Elsevier Science, 2022.

### REFERENCES

1. Berson, Alex and Smith, Stephen J. Data Warehousing, Data Mining & OLAP. Paperback. McGraw-Hill Education (India) Pvt Limited, 1 July 2017.
2. Soman, K. P., Diwakar, Shyam and Ajay, V. Insight into Data Mining: Theory and Practice. 1st Edition (Eastern Economy Edition), Paperback. Prentice Hall of India, April 8, 2010.
3. Witten, Ian H., Frank, Eibe and Hall, Mark A. Data Mining: Practical Machine Learning Tools and Techniques. 3<sup>rd</sup> Edition, Paperback. Morgan Kaufmann Publishers In, 2011

## Social Media Mining

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### MODULE 1: Introduction

9 Hours

Introduction, Statistical properties of social networks: Static and dynamic properties, Random walk and their applications: Random walk on graphs - Algorithms for Computing Personalized Pagerank and Simrank – Text analysis

#### MODULE 2: Community Discovery And Node Classification

9 Hours

Introduction, Communities in context, Core methods: KL algorithm– Agglomerative & divisive algorithm – Markov clustering, Node classification: Introduction- Node classification problem – Random walk based methods

#### MODULE 3: Evolution and Link Prediction In Social Networks

9 Hours

Evolution: Introduction – Modeling a network actor across time frame – Challenges – Laws of evolution – Incremental mining, Link prediction: Introduction – Feature based linked prediction – Bayesian and Probabilistic relational models

#### MODULE 4: Privacy In Social Networks

9 Hours

Introduction, Privacy breaches: Disclosure of identity, social links and attribute, Privacy definition for publishing data: k-anonymity, l-diversity & t-closeness – Differential privacy, Privacy preserving mechanisms for social networks

#### MODULE 5: Visualizing Social Networks

9 Hours

Introduction, Taxonomy of visualization: structural- semantic – temporal, Visualization and analytics: Centrality-based Visual Discovery and Exploration

**Total Hours : 45**

### TEXT BOOK

1. Aggarwal, Charu C. Social Network Data Analytics. 2011 Edition, Paperback. Springer-Verlag New York Inc., 2014.

### REFERENCES

1. Wasserman, Stanley and Faust, Katherine. Social Network Analysis: Methods and Applications (Volume 8 of Structural Analysis in the Social Sciences, ISSN 0954- 366X). Hungary: Cambridge University Press, 1994.
2. Furht, Borko. Handbook of Social Network Technologies and Applications. 2010 Edition, Paperback. Springer-Verlag New York Inc., 28 November 2014.
3. Mika, Peter. Social Networks and the Semantic Web. Softcover reprint of hardcover 1st ed. 2007 Edition, Paperback. Springer-Verlag New York Inc., 29 November 2010.
4. Xu, Guandong., Zhang, Yanchun and Li, Lin. Web Mining and Social Networking: Techniques and Applications. 2011th edition, Paperback. Springer-Verlag New York Inc, 2012.
5. Breslin, John., Passant, Alexandre., Decker, Stefan. The Social Semantic Web. 2009th Edition, Paperback. Germany: Springer-Verlag Berlin and Heidelberg GmbH & Co. K, 31 October 2014.

## Artificial Intelligence

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

**Unit 1: Problem Solving by Searching** **9 Hours**

Introduction to AI - Intelligent agents, Searching - Uninformed, Informed, Stochastic search strategies.

**Unit 2: CSPs and Gaming** **9 Hours**

Constraints satisfaction problems, Gaming: minimax algorithm, alpha-beta pruning.

**Unit 3: Logic and Inference** **9 Hours**

Knowledge based agents, Knowledge representation using Propositional and First-Order logic, Resolution, Unification, Inference - Backward chaining, forward chaining.

**Unit 4: Reasoning with Uncertainty** **9 Hours**

Quantifying uncertainty - Semantics and Inference of Bayesian Networks, Inference in Temporal Models - Hidden Markov Models, Markov Decision Processes.

**Unit 5: Decision Making and Learning** **9 Hours**

Decision networks, Markov Decision Processes, Learning from examples, Reinforcement learning, Case study - Natural Language Processing.

**Total hours: 450 Hours**

### Text Book

1. Russell, Stuart and Norvig, Peter. Artificial Intelligence: A Modern Approach (Prentice Hall Series in Artificial Intelligence). 3rd Edition, Hardcover. Pearson Education, 16 February 2010.

### References:

1. Patterson, Dan W. Introduction to Artificial Intelligence and Expert Systems. First Edition, Paperback. Pearson Education India, January 2015. (Unit-III).
2. Knight, Kevin., Rich, Elaine and Nair, Shivashankar B. ARTIFICIAL INTELLIGENCE. Third Edition, Paperback. McGraw Hill Education. 1 July 2017. (Unit- I, II, IV, & V).
3. Winston, Patrick Henry. Artificial Intelligence. Third edition, Paperback. Pearson India, 1 January 2009.
4. Khemani, Deepak. First Course in Artificial Intelligence. 6<sup>th</sup> Reprint 2018 Edition, Paperback. McGraw Hill Education, 1 July 2017.
5. WEB RESOURCES: <http://nptel.ac.in/>

## Minor Stream 3 (Banking and Finance)

### Money, Banking and Finance

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

**Unit 1: Introduction:** Evolution of money, Institutions and Policy: Metallic standards and their breakdown, Innovations in the forms of money

**5 hours**

**Unit 2: Demand and Supply of Money:** Money and the Financial System, Supply of money, Determinants of the Supply of Money, Demand for Money: Quantity Theory framework, Keynesian Model, Restatement of Quantity Theory of Money, Tobin Model, Baumol Model, Money Supply-Measures and components of money stock, determinants of money supply and money-multiplier, credit creation and commercial banks

**10 hours**

**Unit 3: Central Banks and Objectives of Monetary Policy-** money supply in a closed and open economy, Tools of Money Supply Control, Direct and indirect instruments of monetary policy, Open market operations, Currency-Deposit-Ratio, Cash Reserve Ratio, Statutory Liquidity Ratio, interest rates - Repo Rate, Bank Rate, Reverse Repo rate, Term Structure of Interest Rates

**10 Hours**

**Unit 4: Interlinkages between Monetary and Fiscal Sectors:** Monetization of the fiscal deficits, Public debt and monetary policy.

**10 Hours**

**Unit 5: Overview of the Indian Financial System.** Banking Industry: Structure, Competition, and Regulation (with special reference to the Indian context). Banking Sector: The Role of Development. Banking Sector Reforms in India. Financial Crises and the Subprime Meltdown. Banking and the Management of Financial Institutions. Basel Norms and their implications.

**10 Hours**

**Total Hours - 45**

### Textbook

1. Mishkin, Frederic S. The Economics of Money, Banking, and Financial Markets. 13<sup>th</sup> Edition, Paperback. Pearson Education Ltd, 24 August 2021.
2. Ray, Partha. Monetary Policy: Oxford India Short Introductions. 1<sup>st</sup> Edition, Paperback. India: OUP India, 23 May 2013.

### References:

1. Ministry of Finance, Government of India. Report of the Committee on Banking Sector Reforms, 1998.
2. Gupta, Suraj B. Monetary Economics: Institutions, Theory and Policy. Paperback. India: S Chand & Company, 1 December 2010.

## Financial Economics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit I: Indian Financial Markets and Institutions

10 Hours

A Broad Overview of Financial Markets; Role of Financial Institutions and Markets; Indian Financial System; Overview of Financial Institutions like Commercial Banks, Insurance Companies, NBFIs, etc; Indian Financial Markets like G-Sec Market, Market for State Govt. Bonds, Corporate Bond Markets, Call Money Market, Repo Market, etc.; Financial Instruments like Treasury Bills, Commercial Papers, Certificate of Deposits, etc.

#### Unit II: Fundamentals of Financial Economics

10 Hours

Financial System and Economic Development; Consumption and investment without capital markets; Consumption and investment with capital markets; Welfare Implications in the presence of Financial Markets; Discounted Cash Flow; Bond Valuation and the Term Structure of Interest Rates; Stock Valuation.

#### Unit III: Asset Pricing Theory

15 Hours

Choice under uncertainty; Expected utility theorem; Markowitz and Arrow-Pratt measures of risk aversion; Risk premium and cost of gamble; Mean-variance portfolio theory; Capital market line; Capital asset pricing model (CAPM); The beta of an asset and of a portfolio; Security market line; CAPM model in investment analysis; Empirical testing of CAPM; Efficient Market Hypothesis; Stock Price Reactions; Evidences of weak, semi-strong and strong form efficiency; Empirical anomalies to market efficiency.

#### Unit IV: Capital Budgeting and Capital Structure

10 Hours

Net Present Value (NPV), Internal Rate of Return (IRR) and other investment rules; Cash flows for capital budgeting purposes; Making capital investment decisions; Inflation and capital budgeting; Real versus nominal discounting; Risk analysis, real options, and capital budgeting; Modigliani-Miller Proposition on Capital Structure; Levered versus unlevered firm; Gains from leverage.

### Text Book:

(1) Copeland, T. E., Weston, J. F., and Shastri, K. (2007). Financial theory and Corporate Policy, 4<sup>th</sup>/e, Pearson Education

(2) Ross, S., Westerfield, R. W., Jaffe, J., Jordan, B. D., and Kakani, R. K. (2016). Corporate Finance, 11/e. McGraw Hill Education (India) Private Limited

## Reference Books:

1. Bhole, L.M and Mahakud, Jitendra. Financial Institutions & Markets: Structure, Growth & Innovation. 6th Edition, Paperback. India: McGraw-Hill Education (India) Pvt Limited, 25 June 2017.
2. Damodaran, Aswath (2018). Applied Corporate Finance, 4/e. Wiley India Pvt. Ltd.
3. Gordon, E and Natarajan, K. Financial Markets and Services. 12<sup>th</sup> Edition, India: Himalaya Publishing House, 2023.
4. Luenberger, David G. Investment Science. 2nd Edition, Hardcover. India: Oxford University Press, 24 June 2013.
5. Hull, John C and Basu, Sankarshan. Options, Futures, and other Derivatives. 11<sup>th</sup> Edition, Paperback. India: Pearson India, 1 April 2022.
6. Copeland, Thomas E., Weston, John Fred and Shastri, Kuldeep. Financial Theory and Corporate Policy. 4th Edition, Paperback. Pearson Education, 2013.

## Financial Econometrics

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit I: Classical Linear Regression Model

**10 Hours**

Brief overview of classical linear regression model; Statistical Inference and hypothesis testing; Examples from financial markets; Data mining and true size of the test; Hedonic pricing model; Multicollinearity; Adopting the wrong functional form; Omission of an important variable; Inclusion of an irrelevant variable; Parameter stability tests; Measurement errors; A strategy for constructing econometric models; Determinants of sovereign credit ratings.

#### Unit II: Time Series Modeling and Forecasting

**15 Hours**

Understanding the Concepts; Moving average processes; Autoregressive processes; ARMA processes; Building ARMA models: The Box–Jenkins approach; Examples of time-series modelling in finance; Exponential smoothing; Forecasting in econometrics; Vector Autoregressive Models (VAR); Causality tests; VARs with exogenous variables; Impulse responses and variance decompositions; VAR Model example from finance.

#### Unit III: Modeling Volatility and Lond-Run Relationship in Finance

**10 Hours**

Stationarity and Unit Root Testing; Tests for Unit Roots in the Presence of Structural Breaks; Cointegration; Equilibrium Correction or Error Correction Models; Testing for Cointegration in Regression: A Residuals-Based Approach; Methods of Parameter Estimation in Cointegrated Systems; Lead–Lag and Long-Term Relationships Between Spot and Futures Markets; Purchasing Power Parity; Cointegration Between International Bond Markets; Testing the Expectations Hypothesis of the Term Structure of Interest Rates; Models for Volatility; Implied Volatility Models; Autoregressive Conditionally Heteroscedastic (ARCH) Models; Generalised ARCH (GARCH) Models; Estimation of ARCH/GARCH Models; Extensions to the Basic GARCH Model; Asymmetric GARCH Models; The GJR model; The EGARCH Model; Tests for Asymmetries in Volatility; Volatility Forecasting: Some Examples and Results; Multivariate GARCH Models; A Multivariate GARCH Model for the CAPM; Estimating a Time-Varying Hedge Ratio

#### Unit IV: Switching and State Space Models

**10 Hours**

Seasonalities in Financial Markets; Modelling Seasonality in Financial Data; Estimating Simple Piecewise Linear Functions; Markov Switching Models; A Markov Switching Model for the Real Exchange Rate; A Markov Switching Model for the Gilt–Equity Yield Ratio; Threshold Autoregressive Models; Threshold Models for FTSE Spot and Futures; Regime Switching Models and Forecasting; State Space Models and the Kalman Filter

## **Text Book:**

1. Introductory Econometrics for Finance by Chris Brooks, Fourth Edition; Cambridge University Press

## **Reference Books:**

1. The Econometrics of Financial Markets by Andrew W. Lo, John Y. Campbell and A. Craig MacKinlay; Princeton University Press, Latest Edition.
2. Financial Econometrics: Models and Methods by Oliver Linton; Cambridge University Press, Latest Edition.
3. Basic Econometrics by Damodar N Gujarati and Dawn C. Porter; McGraw Hill Education, Latest Edition.
4. Introductory Econometrics: A Modern Approach by Jeffrey M. Wooldridge; United Kingdom: MIT Press, Latest Edition.

## Financial Markets

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Contents of Syllabus

**Unit 1: Global Financial Markets:** Why Study Financial Markets and Institutions? Overview of the Financial System - Introduction to Global Financial Market - Role of Financial Market in Economic Development of a country - Stake holders in Financial Market (Domestic and Global) - Indian Financial Markets **9 Hours**

**Unit 2: Interest Rates and Financial Institutions:** Interest Rates Meaning and Role in Valuation - Changes in Interest Rates - Effect of Risk and Term Structure on Interest Rates. Reserve Bank of India. Conduct of Monetary Policy: Tools, Goals, Strategy, and Tactics central government securities: bonds, t-bills, state government bonds - Open market operations - Securities Trading Corporation of India - Primary dealers in Government Securities - Clearing Corporation of India **9 Hours**

**Unit 3: Fixed Income markets:** Money market, structure, instruments, functioning of money markets, Bond market structure, and term structure of interest rates. Long term debt securities, Corporate bonds, Zero Coupon bonds, bond features, identifying cashflows associated with a bond, valuation of bonds, Derivatives in Fixed Income markets, hedging interest rate risks, Forwards and Swaps Credit Default Swaps -Collateralized Debt Obligations (CDO) - Pricing of Credit Derivative Instruments. Credit Rating: Introduction - Rating Services -Objectives and types - Uses - Credit Rating Process -Credit Rating, Methodology - Rating Revisions - Credit Rating Agencies in India and abroad - Limitations with case studies Impact of various Policies of Financial Markets: Credit Policy of RBI - Fed Policy - Inflation Index, CPI, WPI, etc **9 Hours**

**Unit 4: Equity Markets:** Market Structure, functioning, primary and secondary markets, Institutions, SEBI, the features of equity securities, the cash flows associated with equity securities, Valuation of equity and preferred securities, dividend discount model, Derivatives in Equity Markets, Option pricing, Forward and Future contracts, trading venues, the mechanics of securities trading, terminology, types of orders like margin buying, short selling, settlement systems **9 Hours**

**Unit 5 Currency Markets:** The underlying theories, the instruments traded, the associated risks such as transaction exposure, operating exposure, translation exposure, etc. and how those risks are addressed/redressed using several techniques including using derivative instruments such as currency options, currency futures and currency swaps. Treasury risk management policy, control and reporting requirements stop loss limits, VAR and Capital positions, Developing risk framework for organization. **9 Hours**

**Total hours - 45**

### Suggested Readings

1. Mishkin, Frederic., Eakins, Stanley G. Financial Markets and Institutions. 10th Edition, Paperback. Brazil: Pearson, 24 August 2023.

2. Cecchetti, Stephen Giovanni and Schoenholtz, Kermit L. Money, Banking, and Financial Markets. 4th edition, Hardcover. McGraw-Hill/Irwin, 16 October 2014.
3. Shiller, Robert J. The New Financial Order: Risk in the 21st Century. Paperback. USA: Princeton University Press, 2004.
4. Siegel, Jeremy J. Stocks for the Long Run: The Definitive Guide to Financial Market Returns & Long-Term Investment Strategies. 5<sup>th</sup> Edition, Hardcover. United States: McGraw-Hill Education, 2014.
5. Gupta, Shashi K and Rangi, Parneet. International Financial Markets and Foreign Exchange. Paperback. Kalyani Publishers.
6. Fabozzi, Frank J., Ferri, Michael G., Modigliani, Franco and Jones, Frank J. Foundations of Financial Markets and Institutions. Hardcover. United Kingdom: Prentice Hall, 2002.
7. Shiller, Robert J. Finance and the Good Society. Revised edition Princeton University Press, 21 April 2013.
8. Pathak, Bharati. V. Indian Financial System. 5th Edition, Paperback. Pearson Education India, 2 January 2018.
9. Singh, Preeti. Dynamics of the Indian Financial System: Markets, Institutions & Services. Paperback. United Kingdom: Global Professional Publishing Ltd., 17 May 2012.
10. Khan. M.Y. Indian Financial System. 11<sup>th</sup> Edition, Paperback. McGraw Hill Education (India) Private Limited, 15 July 2019.
11. Avadhani, V. A. Investment and Security Markets in India. Paperback. Himalaya Publishing House. 2 July 2019.

## Auditing

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Contents of Syllabus

**Unit 1: Basic Principles of Auditing:** Definition - Nature and Scope of Auditing - Difference between Accounting, Auditing and Investigation - Objects of Audit - Qualities of an Auditor - Types of Audit. **9 hours**

**Unit 2: Audit Planning and Internal Control:** Preparatory steps to be followed in the commencement of a new audit - Audit Programme - Audit Notebook - Audit Working Papers - Audit Files- Audit report - Essentials of Effective Reporting. Internal Control: Elements - Objectives - Internal check - Objects of Internal Check - Duties of an auditor in connection with Internal check **9 hours**

**Unit 3: Verification Procedures:** Definition - Meaning -types, relevance, reliability, sufficiency, sources of audit evidence, Audit procedures, Audit sampling, Analytical procedures **9 hours**

**Unit 4: Audit of limited companies:** Company Auditor - qualification, disqualification, Appointment - Remuneration - rights and duties - removal of auditor - Liabilities of the auditor - Civil and Criminal liabilities **9 hours**

**Unit 5: Auditing of computerized accounting and Green Audit:** EDP Audit - EDP Audit features and limitation - General approach to EDP Audit - Special Techniques for Auditing in EDP environment - Need for Computer Assisted Auditing Techniques (CAAT) - Types and Uses of CAAT - Green (Environmental) Audit: Definition - Objectives - Stages of Green Auditing. **9 hours**

### Suggested Readings

#### Books

1. Messier, William F., Glover, Steven M and Prawitt, Douglas F. Auditing & Assurance Services: A Systematic Approach. 12th edition. McGraw-Hill Education, 15 October 2021.
2. Arens, Alvin A., Elder, Randal J., Beasley, Mark S and Hogan, Chris E. Auditing and Assurance Services: An Integrated Approach. 18<sup>th</sup> Edition. United Kingdom: Pearson, 2023.
3. Knapp, Michael C. Contemporary Auditing: Real Issues and Cases. 12<sup>th</sup> Edition, Paperback. United States: Cengage, 2021.
4. Pagare, Dinkar. Principles and Practice of Auditing. Paperback. Sultan Chand & Sons, 2020.
5. Gupta, Kamal. Contemporary Auditing. 6<sup>th</sup> Edition, Paperback. India: Tata McGraw-Hill, 2004.

6. Jain D P. Auditing. First Edition, Paperback. Vayu Education of India, 1 January 2013.
7. Kumar, Ravinder and Sharma, Virender. Auditing: Principles and Practice. 3<sup>rd</sup> Edition (Eastern Economy Edition), Paperback. India: PHI Learning, 2015.
8. Sharma T. R and Sahai, I. M. Auditing. Paperback. Agra : Sahithya Bhavan,2021.
9. Sundar. K and Paari. K. Practical Auditing. 2<sup>nd</sup> Edition, Paperback. Chennai : Vijay Nicole Imprints Pvt. Ltd., 1 June, 2019.
10. Tandon B. N. Auditing. Revised Edition, Paperback. New Delhi: Sultan Chand and Sons, 4 February 2007.

## Study Material

- ICAI

## Investment Management

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Contents of Syllabus

**Unit 1: Introduction:** Returns and Risk; Some Basic Statistics, how securities are issued, interest rates, risky asset returns, historical evidence, dependence, active vs passive investing, risk adjusted return measures. **9 hours**

**Unit 2: Diversification:** Choosing Optimal Portfolios; Asset Allocation Strategic allocation and Tactical asset allocation, combining a risk-free & a risky asset, Asset Allocation – Implementation, risk aversion and indifference curves. **9 hours**

**Unit 3: Estimating Risk and Return:** Factor Models and Beta Estimation of risk, Describe measures of risk, including standard deviation and downside deviation, Describe reward-to-risk ratios, including the Sharpe and Treynor ratios - Asset Pricing Models, CAPM and APT macro factors), Identifying Additional Risk Factors / Factor Model Applications liquidity facto, Fama-French 3-factor model, Financial Market Anomalies, Some Issues in the Pricing of Fixed Income Securities Bond Valuation Principles, types of money market and fixed-income securities, term structure of interest rates, duration & immunization, Fixed Income Arbitrage, Default Rates and Low-Grade Bonds, Securitization. **9 hours**

**Unit 4: Performance Evaluation:** Evaluating Managed Fund Performance, holding period and time weighted rates of return bench marking, style analysis, performance attribution, concept of alpha, tracking error and information ratio Investment Strategy Implementation and Costs, Trading, Trader Behavior, Trading Costs Behavioral Finance. Implementation of Active Portfolio Quantitative Equity Investing, margin, short selling, Hedge Funds Market Timing. **9 hours**

**Unit 5: Alternative Investments:** Hedge funds, private equity, real estate, commodities, and infrastructure, diversifications and higher returns. **9 hours**

### Suggested Readings

1. Bodie Zvi., Kane, Alex and. Marcus, Alan. J. Investments. 13<sup>th</sup> Edition, Paperback. McGraw-Hill Education, 21 March 2023.
2. Baxter, Martin., Rennie, Andrew. Financial calculus: An Introduction to derivative pricing. Hardcover. United Kingdom: Cambridge University Press, 1996.
3. Elton, Edwin J., Gruber, Martin J., Brown, Stephen J., Goetzmann, William N. Modern Portfolio Theory and Investment Analysis. 9<sup>th</sup> Edition, Paperback. United Kingdom: Wiley, 2014.
4. Hirt, Geoffrey A., Block, Stanley B. Fundamentals of Investment Management. 10<sup>th</sup> Edition, Hardcover. McGraw-Hill Education, 2011.
5. Leeds, Sanford., Reilly, Frank., Brown, Keith. Investment Analysis and Portfolio Management. 12<sup>th</sup> Edition, Hardcover. Cengage South-Western, 2024.
6. Markowitz, Harry M., Todd, G. Peter. Mean-Variance Analysis in Portfolio Choice and Capital Markets. Hardcover. Wiley, 2000.

7. Luenberger, David G. Investment Science. Hardcover. India: Oxford University Press, 2014.
8. Chandra, Prasanna. Investment Analysis and Portfolio Management. 6<sup>th</sup> Edition, Paperback. India: Tata McGraw-Hill Education, 27 August 2021.
9. Fischer, Donald. E., Jordan, Ronald. J and Pradhan, A.K. Security Analysis and Portfolio Management. 7<sup>th</sup> Edition, Paperback. India: Pearson Education, 30 October 2018.
10. Grinold, Richard C., Kahn, Ronald N. Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Selecting Superior Returns and Controlling Risk. 2<sup>nd</sup> Edition, Hardcover. United States: McGraw Hill LLC, 1999.
11. Kinlaw, William., Kritzman, Mark P., Turkington, David. A Practitioner's Guide to Asset Allocation. Hardcover. Wiley, 2017.
12. Swensen, David F. Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment. Fully Revised and Updated, Hardcover. Free Press, 2009.

## Derivatives and Risk Management

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit I: Fundamentals of Derivatives

5 Hours

Introduction; Definition of derivatives; Different types of derivatives – forward, futures and options; Derivatives Market in India.

#### Unit II: Futures Market and Hedging Strategies

15 Hours

Forward vs futures contract; Specification of a futures contract; The operation of Margin accounts; Hedging strategies using futures; Cross hedging; Investment assets vs consumption assets; Short selling; Determination of forward and future prices; Stock index futures; Forward and future contracts on currencies; Commodity Futures with examples and case study analysis.

#### Unit III: Interest Rate Derivatives

10 Hours

Interest Rate Futures in India; Definition of swaps; Interest rate vs currency swaps; Valuation of interest rate swaps; Fixed-for-fixed currency swaps; Valuation of Fixed-for-fixed currency swaps; Other currency swaps: fixed-for-floating and floating-for-floating; Credit Exposures and Derivatives; Securitization and the financial crisis of 2007-08.

#### Unit IV: Option Contracts and Pricing

15 Hours

Types of options; Call vs put options; European vs American options; Factors affecting option prices; Put-call parity; Option Pricing and Hedging; Implied volatilities of call and put; Value at Risk (VaR); Price Volatility Approach for Measuring Price Risk, Using the excel spreadsheet for Measuring Price Risk.

#### Textbook:

1. Foreign Exchange, International Finance and Risk Management by A. V. Rajwade and H. G. Desai, Shroff Publishers, Latest Edition
2. 2. Options, Futures, and Other Derivatives by John C. Hull and Sankarshan Basu, Pearson, 11th edition.

#### Reference Books:

1. Handbook of Debt Securities and Interest Rate by A. V. Rajwade, McGraw Hill Education, latest edition.
2. Introduction to Derivatives and Risk Management by Don M. Chance, Robert Brooks, Sanjay Dhamija, Cengage India, latest edition.
3. Derivatives and Risk Management by N R Parasuraman, McGraw Hill India; latest edition.
4. Financial Engineering: Derivatives & Risk Management by Keith Cuthbertson & Dirk Nitzsche, Wiley; latest edition.

## Financial Modelling

Course Category	L	T	P	C
MS	0	0	6	3

### Detailed Syllabus

#### Unit 1 Introduction to Models

**10 hours**

Definition of models, dependent and independent variables, constructing relationships between variables, identifying key variables and sensitivities, Modelling principles, conventions and best practices, Spreadsheet errors and consequences, Error Trapping; Auditing and review of spreadsheet models.

#### Unit 2 Review of Advanced Spreadsheet Techniques

**20 hours**

Review of Advanced Spreadsheet Techniques, formula and functions, Array functions, Solver, goal seek, Data tables, scenario manager, evaluate a small business opportunity, conduct what-if analysis, identify key variables using sensitivity analysis

#### Unit 3 Construction of a 3 Statement Model

**20 hours**

Construction of a spreadsheet model for 3 statements, Balance Sheet, Profit and Loss Account and Cashflow: Analysis of historical data Organizing the lay out reflecting assumptions, objectives, outcomes, sensitivities, create a basic 3 statement model, valuation using DCF methods Linking cashflow models to projected financial statements.

#### Unit 4 Forecasting and Scenario Modelling

**20 hours**

Creating, validating, and using regression models to fit the trends of historical data; estimating the accuracy of forecasts; handling the risks inherent in forecasts; Analytical methods to model variable uncertainty, incorporating key risk elements in the model Modelling large multiple variables and high-risk variables using probability distributions, simulations using Monte Carlo methods.

#### Unit 5 Creating Dashboards

**20 hours**

Dashboard design principles, advanced charting, Form control, data validation, conditional formatting, adding interactivity, Pivot Tables, Slicers, Pivot charts

### Suggested Readings

1. Michael Rees, Financial Modelling in Practice - A Concise Guide for Intermediate and Advanced Level, Wiley Finance
2. Sengupta, Chandan. Financial Modeling using Excel and VBA. John Wiley and Sons
3. John S. Tjia. Building Financial Models (McGraw-Hill Finance & Investing)

4. Danielle Stein Fairhurst, Using Excel for Business and Financial Modelling: A Practical Guide, Wiley Finance
  5. Beninga, Simon. Financial Modeling, MIT Press
  6. Isaac Gottlieb, Next Generation Excel: Modeling in Excel for Analysts and MBAs. Wiley Finance
  7. Thomas S. Y. Ho and Sang Bin Lee, the Oxford Guide to Financial Modelling. Oxford University Press
  8. Eric Soubeiga, Mastering Financial Modeling: A Professional's Guide to Building Financial Models in Excel. McGraw Hill
  9. Timothy Mayes. Financial Analysis with Microsoft Excel, Cengage
  10. Stephen Powell and Kenneth Baker. Management Science: The Art of Modeling. Wiley
- Note: Latest edition of text books to be used.

## Business Valuation

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit 1 Introduction to Valuation

6 hours

An understanding of 'Value' - The nature and scope of Valuation – Objectives of Valuation Importance of Business Valuation - Misconceptions about Valuation Elements of Business Valuation - Conceptual Overview – Valuation Approaches Choice of Approach - Fair Market Value - Adjustments for Valuation Purposes

#### Unit 2 DCF Valuation

14 hours

Estimating discount rates, cashflows, growth, terminal values, Choosing right model, forecasts, crossholdings, cash, management options, sensitivity analysis

#### Unit 3 Relative Valuation, Asset Based Valuation and Private Company Valuation

12 hours

Multiples, PE & PEG ratios, choosing right comparable, choosing right multiples, Private company valuation, risk estimation, illiquidity issues, Asset based and liquidation values Brand name valuation, intangibles.

#### Unit 4 Acquisitions and Mergers

8 hours

Basic Concepts in Mergers and Acquisitions – valuation issues, debt transference, control premium, synergy, cost savings.

#### Unit 5 Contingent Claim Valuation

5 hours

Real options embedded, economic value of options, options in projects, investments, acquisitions, patents, options to delay, Valuing young companies, valuing distressed companies.

### Suggested Readings

1. Damodaran, Ashwath. Damodaran on Valuation: Security Analysis for Investment and Corporate Finance Wiley Finance
2. Damodaran Aswath. Dark Side of Valuation: The Valuing Young, Distressed and Complex Businesses. Pearson Education
3. Damodaran Aswath. Investment Valuation: Tools and Techniques for Determining the Value of any Asset. Wiley Finance
4. Koller, Goedhart and Wessels McKinsey & Co. Valuation: Measuring and Managing the Value of Companies, John Wiley & Sons

5. Koller, Goedhart and Wessels McKinsey & Co. Valuation Workbook: Step-by-Step Exercises and Tests to Help You Master Valuation. Wiley Finance
  6. Sheridan Titman and John Martin, Valuation: The Art & Science of Corporate Investment Decisions. Prentice Hall
  7. Richard Barker. Determining Value: Valuation Models and Financial Statements. Prentice Hall
  8. Krishna G. Palepu, Paul M. Healy Business Analysis and Valuation: Using Financial Statements. Cengage
  9. James R. Hitchner. Financial Valuation: Applications and Models. Wiley
  10. Robert Holthausen and Mark Zmijewski. Corporate Valuation: Theory, Evidence and Practice. Cambridge Business Publishers
  11. Koller T, Goedhart M & Wessels D. Valuation: Measuring and managing the value of companies. Mckinsey & Company.
  12. Palepu K.G & Healey P.M. Business analysis and valuation: Using financial Statements. Cengage Publications.
  13. Parks J.A & Banerjee D.N Principles & Practice of valuation. Eastern Law house.
- Note: Latest edition of text books to be used.

## Digital Finance

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit 1 The Digital Finance Ecosystem

5 hours

Digital Finance Landscape: Technological evolution - Impact of technology on the digital finance landscape - Impact of technology on banking/financial markets

Digital Finance Ecosystem: Digital ecosystem - Digital finance services (DFS) ecosystem - The payments ecosystem

FinTech (Innovations): FinTech in business - Current use of FinTech by accounting and finance professionals - Innovation thinking in FinTech

Digital Transformation: Organisational strategy - Digital transformation strategies - How digital transformation strategy can help achieve an organisation's goals

#### Unit 2 Future of Money

15 hours

Digital Currency: Money and currency - Digital currencies – Cryptocurrency

Digital Payments: Types of digital payments - The future of digital payments

Distributed Ledger Technology: Blockchain technology - Smart contract technology - Blockchain in financial services and beyond

Cryptocurrencies: Decentralised finance (DEFI) - Impact of cryptocurrencies on finance and future outlook

Alternative Finance Providers: Concept of alternative finance – Alternative lending - Alternative funding - Crypto-based funding - Impact on the organisation

#### Unit 3 Central Bank Digital Currency & Regulation

5 hours

Concept – Types: Retail & Wholesale – Comparison with Traditional Currency - UPI vs CBDC - Model of Issuance – Regulatory Framework - CBDC Initiative in India and various countries – Impact on Financial System – Challenges & Risks – CBDC and Monetary Policy

#### Unit 4 Technology & its Use in Finance

10 hours

Automation: basics of automation - Value of automation - Planning for success

Robotic Process Automation (RPA): Basics of RPA - Benefits of RPA - Risks and challenges for using RPA – Building an effective RPA strategy

Artificial Intelligence (AI): Basics of AI - Benefits of AI - Risks and challenges for using AI - Building an effective AI strategy

Machine Learning (ML): Basics of ML - Benefits of ML - Risks and challenges for using ML – Building an effective ML strategy

Value of Technologies: Choosing the best technology - Reshaping for an automated future

## **Unit 5 Future of Data Driven Finance**

**15 hours**

Case Studies – Revolut, Alibaba, Aadhar, Digibank, Credit Karma, CRED

### **Suggested Readings**

1. John Hill. Fintech and the Remaking of Financial Institutions. Academic Press
2. Devie Mohan. The Financial Services Guide to Fintech: Driving Banking Innovation Through Effective Partnerships. Kogan Pag
3. David Lee Kuo Chen (Ed). Handbook of Digital Currency. Elsevier
4. David Lee Kuo Chen and Linda Low. Inclusive Fintech. World Scientific.
5. David Lee Kuo Chen and Robert Deng (Eds). Handbook of Blockchain, Digital Finance and Inclusion. Academic Press.
6. Chris Skinner. Digital Bank. Marshall Cavendish Business

Note: Latest edition of text books to be used.

## Principles of Insurance

Course Category	L	T	P	C
MS	3	0	0	3

### Detailed Syllabus

#### Unit 1 Introduction

5 hours

Concept of risk, Types of risk, Assessment and Transfer, Sources and Measurement of risk, Risk evaluation and Prediction, Disaster risk management, Risk retention and Transfer

#### Unit 2 Insurance I

12 hours

Concept of insurance, Need for insurance, Principles of utmost good faith, Insurable interest, Indemnity, Economic Function, Proximate cause, Subrogation and Contribution.

#### Unit 3 Insurance II

8 hours

Types of insurance: Life and Non-life insurance; Features, Need and Policies of insurance; Reinsurance and Co-insurance: Features, Objectives and Methods; Bancassurance- features and Merits.

#### Unit 4 Insurance & Risk Management

10 hours

Legal aspects of insurance contract, Loss Assessment and Loss control, Control of Malpractices and Mis-selling, Exclusion of perils, Actuaries, Computation of insurance premium.

#### Unit 5 Regulatory Framework of Insurance

10 hours

Regulatory Framework of Insurance, IRDA act 1999: objectives of IRDA, Composition of IRDA, Duties, Powers and Functions of IRDA, Role of IRDA, Delegation of powers, establishment of Insurance Advisory Committee, powers to make regulations.

### Suggested Readings

1. George, E, Rejda, Principles of Risk Management and Insurance. Pearson Education
2. Gupta. P.K. Insurance and Risk Management, Himalaya Publishing House
3. Mishra, M.N. Principles and Practices of Insurance. Sultan Chand & Sons.
4. Vaughan, E.J. and Vaughan, T, Fundamental of Risk and Insurance, Wiley & Sons
5. Crane, F. Insurance Principles and Practices, John Wiley and Sons, New York
6. Dorfman, Marks S. Introduction to Risk Management and Insurance, Pearson Education

Note: Latest edition of text books to be used.