

Sri Venkateswara College of Engineering
Sriperumbudur (Tk)

Special Elective Courses

(Offered by External Expert Members from Industry/Institution)

Syllabus

R2018

| SE18001 | MATHEMATICS FOR AI & ML | L 3 P 0 T 0 |
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| OBJECTIVES | | |
| To familiarize with the mathematics that is required to understand various models and algorithms in AI and ML | | |
| UNIT I | Basics of Probability | 9 |
| Random Experiment, Sample space, Outcomes and Events, Axioms of Probability, Counting techniques, Conditional Probability, Independent Events, Bayes' Theorem, Random Variables, PMF, PDF, Joint and Marginal distributions, Expectation and Variance of Random Variables, IID Random Variables and their relation to ML training data | | |
| UNIT II | Probability Distributions | 9 |
| Discrete Uniform, Bernoulli, Binomial, Geometric, Negative Binomial, Poisson, Hypergeometric, Categorical, Multinomial distributions, Poisson as an approximation of the Binomial, Continuous Uniform, Exponential, Normal, Beta, Gamma distributions, Memoryless property of Geometric and Exponential distributions, Applications of distributions to AU and ML problems | | |
| UNIT III | Limit Theorems and Sampling Distributions | 9 |
| Moment Generating functions, Probability Generating Function, Strong and Weak Law of Large Numbers, Central Limit Theorem, Sampling with and without Replacement, Statistic, Student's t, Chi-square, F distribution, Markov and Chebyshev Inequality, Chernoff Bound | | |
| UNIT IV | Statistical Inference | 9 |
| Method of Moments, Maximum Likelihood Estimation, Point Estimation, Confidence Intervals, Bias Variance properties of estimators, Consistency of estimators, Cramer Rao lower bound, Hypothesis Testing, Null and Alternative Hypothesis, Type I and Type II errors, p-value, Likelihood Ratio Tests | | |
| UNIT V | Linear Regression and Prediction | 9 |
| Simple Linear Regression model, Method of Least Squares, Matrix formulation, Projection to the Column Space, Normal Equations, Probabilistic framework of Linear Regression, Weighted Least Squares, Covariance and Correlation, Conditional Expectation and Variance, Algorithms for the linear regression problem | | |
| Total 45 Periods | | |
| Outcomes: | | |
| <ol style="list-style-type: none"> 1) The student will have an in depth understanding of the various statistical concepts that are used in AI and ML. 2) This course will prepare the student to understand advanced mathematical models and algorithms in AI and ML. 3) Students will be able to mathematically formulate and study various engineering problems using statistical techniques. | | |

Text Books:

1. R.V. Hogg, J. McKean and A.T. Craig, Introduction to Mathematical Statistics, Pearson Education Limited, 2014.
2. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
3. O. C. Ibe, Fundamentals of Applied Probability and Random Processes, Elsevier, 2005.
4. S. M. Ross, Probability Models for Computer Science, Elsevier, 2002.
5. S. M. Ross, A First Course in Probability, 6th edition, Englewood Cliffs Prentice- Hall, 2001.

Reference Books:

1. Kenneth H. Rosen, Discrete Mathematics and its applications, 7th edition. New York, McGraw Hill, 2012.
2. David C. Lay, Judi J. McDonald and Steven R. Lay, Linear Algebra and its applications, 5th edition, Pearson, 2015.
3. W. Feller, An Introduction to Probability Theory and Its Applications, 2nd edition, John Wiley & Sons Inc., 1957.
4. S. M. Ross, Simulation, 5th edition, Elsevier, 2013.
5. R. A. Johnson and D. W. Wichern, Applied Multivariate Statistical Analysis, 5th edition, PHI Learning Private Limited, 2009.

| SE18003 | FINANCIAL STATEMENT ANALYSIS | L3P0T0 |
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| OBJECTIVES | | |
| This course is designed to help the students in understanding the basics of Financial statements and to have a basic understanding about fundamental analysis. It also gives insights on various valuation methodologies | | |
| UNIT I | Brushing up the Basics | 9 |
| Concept of "Time value of Money" - Interest Rates and Discount Factors – Opportunity cost, Risk-Free Rate, Equity Risk Premium, The Beta, Risk Adjusted Return (Sharpe Ratio) | | |
| UNIT II | Introduction to Financial Statement Analysis | 9 |
| Where can one find financial statements – The Director's Report, The Auditor's Report, Financial Statements: Balance Sheet, Income Statements, Schedules and Notes to the Accounts, Cash Flow Statement | | |
| UNIT III | Financial Statement Analysis and Forensic Accounting | 9 |
| Types of Financial Statement Analysis - Methods of Analyzing Financial Statements - Financial Statement Analysis and Forensic Accounting, Comparative and Common-size financial statements | | |
| UNIT IV | Ratio Analysis | 9 |
| PROFITABILITY RATIOS - ACTIVITY RATIOS OR TURNOVER RATIOS - FINANCIAL RATIOS - MARKET TEST RATIOS - ADVANTAGES OF RATIO ANALYSIS - LIMITATIONS OF RATIO ANALYSIS | | |
| UNIT V | Valuation Of Stocks | 9 |
| Source of Market and Intrinsic Value - Multiplier Approach to Share Valuation - VALUATION OF FIRMS | | |
| Total 45 Periods | | |
| Outcomes: | | |
| After completing this course, students should be able to: | | |
| <ul style="list-style-type: none"> • Understand the basic concepts of Time Value of Money • Get the reports and statements from various sources • Analyze financial statements • Apply the knowledge in valuation methodologies while buying assets | | |

Text Books:

NCFM- Fundamental Analysis Module, NSE

Reference Books:

- Parag Parikh (2016), *Value Investing and Behavioral Finance*. Bangalore, Mc Graw Hill Education
- M.Y. Khan, P.K. Jain (2017), *Financial Management*. Bangalore: McGraw Hill Education
- Raghu Palat (2016), *Fundamental Analysis for Investors*, New Delhi: Vision Books
- Aswath Damodaran (2012), *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, New Delhi: Wiley India

| SE18004 | MANAGERIAL ECONOMICS | L 3 P 0 T 0 |
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| <p>OBJECTIVES Managerial Economics paper aims to expose the students to a rigorous foundation in microeconomics and its applications in planning and decision making of a firm. Its main objective is to develop students' capacity to analyse the economic environments in which business entities operate and understand how managerial decisions can vary under different constraints that each economic environment places on a manager's pursuit. Its focus will be on analysing the functioning of markets, the economic behaviour of firms and other economic agents under various market structures, and the economic and social implications of the outcomes.</p> | | |
| UNIT I | ECONOMICS AND MANAGEMENT | 9 |
| Market Economy and Managerial Economics - Functions of Managerial Economics - Motivations to Study Microeconomics - Understanding Markets - Economic Cost, Opportunity Cost, Implicit Cost, and Explicit Cost; Economic Profit versus Accounting Profit | | |
| UNIT II | PRODUCTION AND COST ANALYSIS | 9 |
| Production - Production function – Isoquant - Equilibrium production - Diminishing rates of return - Laws of production - Cost of Production: Fixed and Variable Costs - Which Costs Matter? Short Run Costs curves: TC, TVC, TFC, MC, ATC, AVC, and AFC; Relation between SR and LR Costs - Economies of Scope - Learning Curves. | | |
| UNIT III | MARKETS AND PRICING AND OUTPUT DECISIONS | 9 |
| Characteristics of Perfect Competition - Profit Maximization and Optimal Output Decision - Sources and Measurement of Monopoly Power - Monopolist's Output Decision and Pricing Rule - Characteristics of Monopolistic Competition - Short Run and Long Run Equilibrium in a Monopolistic Competition - Economic Efficiency of Monopolistic Competition - Characteristics of Oligopoly Collusive and non-collusive oligopoly. | | |
| UNIT IV | NATIONAL INCOME | 9 |
| Introduction to National Income - National Income Concepts - National Income Determination - Business Cycles - Phases of Business Cycles | | |
| UNIT V | ECONOMIC MANAGEMENT | 9 |
| Money and Inflation - Fiscal and Monetary Policies - Public versus Private Sectors - Economic Transition in India - Liberalization, Privatization and Globalization - Business and Government Public-Private Participation (PPP) - Disinvestment - Foreign Direct Investment | | |
| Total 45 Periods | | |
| <p>Outcomes: Learners' appreciation of the analytic strength and practical applicability of microeconomic theory in managerial uses of all types of entrepreneurs. The paper is accordingly scheduled with both theory and applications. The theory serves to construct a rigorous framework of principles and techniques, and the applications bring real aspects into the classroom through multiple cases and examples from everyday sources.</p> | | |

Text Books:

1. Dwivedi D.N., Business & Economics, Vikas Publishing House
2. Dr. Atmanand, Managerial Economics, Excel Books, Delhi.
3. R.L.Varshney, K.L. and Maheshwari, Managerial Economics, Sultan Chand & Sons

Reference Books:

1. Haynes, Mote and Paul, Managerial Economics — Analysis and Cases,
2. Vakils. Feffer and Simons Private Ltd., Bombay.
3. Hague, D.C., Managerial Economics.
4. Introduction to Managerial Economics, Hutchinson University Library.
5. Malcolm P. McNair and Richard S. Meriam, Problems in Business Economics, McGrawHill Book Co., Inc.

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| SE18007 | PROJECT MANAGEMENT | L 3 P 0 T 0 |
| OBJECTIVES To understand the concepts of Project Management through Project Network Diagrams; Time, cost and Resource management and control, project cost control; project monitoring and information systems and implementation of projects. | | |
| UNIT I | Introduction | 6 |
| Projects: Definitions and characteristics; dimensions of project management – project diagrams – networks – network techniques. | | |
| UNIT II | Project Time Management | 12 |
| Time management under certainty – CPM – slackness in projects – time management under uncertainty – PERT – event orientation - simulation | | |
| UNIT III | Cost and Resource Management | 9 |
| Crashing of Projects – time-cost trade-off – projects with limited resources – resource allocation and levelling – project organisation. | | |
| UNIT IV | Cost Control and Information Systems | 10 |
| Project cost control – types of costs – cost codes – cost budgeting – cost control – project information systems: Project control, project monitoring – reports. | | |
| UNIT V | Projects Under Implementation | 8 |
| Implementation of projects – monitoring of projects and control – case studies – multi-project environment. | | |
| Total 45 Periods | | |
| Outcomes: 1. Understanding the concepts and dimensions of managing projects and the dynamics involved 2. Student will be able to conceptualise a project and create networks. 3. Student will be able to apply network techniques such as PERT/CPM for time management. 4. Student will be able to apply cost and resource management principles. 5. Student will be able to do cost control techniques 6. Student will be able to design an effective information system for managing projects. | | |

Text Books:

1. Harold Kerzner, Project Management: A system approach to planning, scheduling, and controlling, CBS Publishers and Distributors
2. S.Choudhary, Project Management, Tata McGraw Hill

Reference Books:

1. John M. Nicholas, Project Management for Business and Technology, Prentice Hall of India.
2. Prasanna Chandra, Project Planning, Analysis, Selection, Implementation. Tata McGraw Hill

| SE18008 | INTRODUCTION TO SECURITIES MARKET | L 3 P 0 T 0 |
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| OBJECTIVES | | |
| This course is designed to help the students in understanding the various products, participants and the functions of the securities market. Also makes students understand the market design of Primary Market & Secondary Market and the government securities market. | | |
| UNIT I | Securities Market in India - An Overview | 9 |
| Securities market and financial system; Products, participants and functions; Primary market; Secondary market; Derivatives market; Regulators; Exchanges; Depositories; Clearing corporations; Regulatory framework; Reforms | | |
| UNIT II | Primary Market | 9 |
| Book building; Credit rating; Merchant banking; On-line IPOs; Demat issues; Private placement; Virtual debt portals; ADRs/GDRs; Other regulations; Public issues; Euro issues; Debt issues; Collective investment vehicles viz., MFs, VCFs, CISs. | | |
| UNIT III | Secondary Market | 9 |
| Membership; Listing; Trading and settlement mechanism; Technology; Trading rules-Insider Trading; Unfair trade practices; Takeovers; Buy back; Turnover; Market capitalization; Prices; Liquidity; Transaction costs; Risk management; Indices. | | |
| UNIT IV | Government Securities Market | 9 |
| Indian debt market; Primary market; Secondary market-NDS; NDS-OM; CCIL; Wholesale debt market (WDM) segment of NSE. | | |
| UNIT V | Derivatives Market | 9 |
| Products, Participants and functions; Trading mechanism; Membership; Contract specification; Clearing & Settlement; Open interest; Implied interest rate; Implied volatility; Risk management; Debt derivatives. Measures of central tendency; Return and Risk. | | |
| Total 45 Periods | | |
| Outcomes: | | |
| <p>Students completing this course will be able to</p> <ul style="list-style-type: none"> • Define various constituents of Securities market • Explain the basic concepts relating to different avenues of investment, • Distinguish between the primary and the secondary market • Gain knowledge related to derivatives market • Analyze financial statement | | |

Text Book:

- NCFM - Securities Markets: Beginners Module, NSE

Reference Books:

- H.R. Machiraju (2019). *Indian Financial System*. New Delhi: Vikas Publishing
- M.Y. Khan, P.K. Jain (2017), *Financial Management*. Bangalore: McGraw Hill Education
- Joydeep Sen, Abhishek Apte (2013), *Fixed Income Markets in India*. Mumbai: Shroff Publishers & Distributors Pvt Ltd