# Detailed Curriculum for Undergraduate Degree
# BBA
# (w.e.f. AY: 2025-26)

## Part VI: Detailed Curriculum

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|---|---|---|---|
| **Course Name**: | **Service Marketing** | | |
| **Course Code**: | BBA-MJ-MM-701 | **Category:** | Management Science Course |
| **Semester**: | 7th SEM | **Credit:** | 4 |
| **L-T-P**: | 3-1-0 | **Pre-Requisites:** | The basic concepts of Marketing Management |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To introduce students to the core concepts, characteristics, and importance of services marketing in the contemporary business environment. |
| 2 | To examine consumer decision-making processes, expectations, and perceptions in the context of services. |
| 3 | To equip students with the knowledge to design and implement the 7Ps of the service marketing mix effectively. |
| 4 | To enable students to formulate strategies for building and maintaining long-term customer relationships in service industries. |

**Course Contents:**

| Module No. | Description of Topic | Contact Hrs. |
|---|---|---|
| 1. | Introduction to Service Marketing: Definition and Characteristics of Services: Understanding the unique aspects of services, Classification of Services: Categorizing services based on various criteria, Importance of Services Marketing: Role of services in the economy and business, Challenges in Services Marketing: Addressing issues like intangibility and perishability. | 7L |
| 2. | Consumer Behavior in Services: Consumer Decision-Making Process in Services: Stages and factors influencing decisions, Expectations vs. Perceptions: Understanding the gap and its impact on satisfaction, SERVQUAL Model: Dimensions of service quality and measurement, Role of Culture: Cultural influences on service expectations and delivery. | 6L |

| | | |
|---|---|---|
| 3. | Service Marketing Mix: Traditional 4Ps: Product, Price, Place, Promotion, Extended 3Ps:People, Process, Physical Evidence, Service Product: Design, development, and bundling with tangible products, Service Pricing: Strategies, challenges, and customer perceptions, Place (Distribution):Channel selection and management in services, Promotion: Integrated marketing communication and service advertising, People: Role of employees in service delivery and customer satisfaction, Process: Service delivery mechanisms and standardization, Physical Evidence: Tangibles that facilitate service delivery and customer perception. | 7L |
| 4. | Service Quality and Customer Satisfaction: Dimensions of Service Quality: Reliability, Assurance, Tangibles, Empathy, Responsiveness, GAP Model: Identifying and addressing service delivery gaps, Customer Satisfaction: Measurement and management techniques. Service Failures and Recovery: Strategies for managing service breakdowns, Service Guarantees: Design and implementation for customer assurance. | 7L |
| 5. | Relationship Marketing and Customer Retention: Customer Relationship Management (CRM): Strategies for building long-term relationships, Customer Loyalty Programs: Design and implementation, Customer Profitability Segmentation: Identifying and nurturing profitable customers, Levels of Relationship Strategies: Transactional to collaborative approaches, Customer Appreciation: Techniques for recognizing and valuing customers. | 7L |
| 6. | Emerging Trends in Service Marketing: Technology in Services: Impact of digitalization and automation, E-Services: Online service delivery models and challenges, Service Innovation: New service development and differentiation, Globalization of Services: Opportunities and challenges in international markets, Sustainability in Services: Eco-friendly practices and corporate social responsibility. | 6L |
| **Total** | | **40L** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | Explain the fundamental concepts and characteristics of services marketing. |
| 2 | Assess consumer behavior and expectations in service contexts. |
| 3 | Design a comprehensive service marketing mix tailored to specific service industries. |
| 4 | Implement relationship marketing strategies to enhance customer loyalty and retention. |

| **Learning Resources:** | |
|---|---|
| 1 | Zeithaml,V.A., Bitner, M J, Grembler, D.D. & Pandit, A.: Service Marketing; TMH |
| 2 | Rao, K.R.M.: Services Marketing, Pearson Education |
| 3 | Rajendra Nargundkar, Services Marketing: Text & Cases, Tata McGrawHill Publishing Company, New Delhi, 2008 |
| 4 | Services- Marketing, Operations, and Management, Jauhari & Dutta, Oxford |

| Alternative NPTEL/SWAYAM Courses: | | | |
|---|---|---|---|
| **Sl. No.** | **NPTEL Course Name** | **Instructor** | **Host Institute** |
| 1 | Strategic Services Marketing, | Prof. Kalpak Kulkarni | IIT Roorkee |
| | Course link: https://nptel.ac.in/courses/110107434 | | |

**OR,**

| **Course Name**: | **Management Accounting** | | |
|---|---|---|---|
| **Course Code**: | BBA-MJ-FM-701 | **Category:** | Management Science Course |
| **Semester**: | 7th SEM | **Credit:** | 4 |
| **L-T-P**: | 3-1-0 | **Pre-Requisites:** | The basic concept of Finance |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| Course Objectives: | |
|---|---|
| 1 | Acquiring essential skills in financial analysis and planning, understanding the core concepts, advantages, and limitations of management accounting, and distinguishing it from economic and cost accounting. |
| 2 | Learning to assess costs, volume, and profits for decision-making and evaluating financial health using various ratios. |
| 3 | Budgeting modules will cover types of budgets and their role in planning and control. |
| 4 | Proficiency in solving problems related to financial analysis, budgeting, and decision-making in diverse business scenarios. |

| Course Contents: | | |
|---|---|---|
| **Module No.** | **Description of Topic** | **Contact Hrs.** |
| 1. | Management Accounting: Meaning, Features, Advantages, Limitations, Scope, and Functions of Management Accounting. Comparison between Management Accounting and Financial Accounting. Accounting, Management Accounting and Cost Accounting. | 6L |
| 2. | Break-Even-Analysis: Concept, Uses and Limitations of Break-Even Analysis, Margin of Safety, Contribution, Uses of P/V ratio for decision making, Cost-Profit-Volume Relationship, Fixed Cost Variation. Problems on Break Even Analysis. | 6L |
| 3. | Ratio Analysis: Meaning of Ratio Analysis, Advantages and Limitations of Ratio Analysis, Types of Ratios. Simple Problems on Current Ratio, Quick RatioAverage, Collection/Payment Period, Stock Velocity, Debt- | 6L |

| | | |
|---|---|---|
| | Equity Ratio, Proprietary Ratio, Gross Profit Ratio, Net Profit Ratio, Operating Ratio. | |
| 4. | Budget: Meaning and Definition of Budget; Characteristics of Budget; Types of Budgets. Problems with the Cash budget. | 6L |
| 5. | Budgetary Control: Meaning and Definition of Budgetary Control, Objectives of Budgetary Control; Limitations of Budgetary Control. Problems on Flexible Budget. | 8L |
| 6. | Sensitivity analysis: changes in costs or prices affect the breakeven point. Detailed cash and flexible budget for various business scenarios. Eg. Pharmacy, readymade garments, etc. Analyse real-world companies using their financial statements to calculate and interpret ratios. | 8L |
| **Total** | | **40L** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | To recall and summarize the principles and distinctions of management, financial, and cost accounting and know about the advantages, limitations, and scope of management accounting, applying it to real-world scenarios. |
| 2 | To utilize break-even analysis for cost-volume-profit assessments and decision-making and assess organizational financial health using ratio analysis. |
| 3 | To judge various budget types, create cash budgets, and evaluate their planning efficacy and develop flexible budgets, analyze variances, and enhance budgetary control skills. |
| 4 | To Combine financial tools to formulate strategic plans, thereby improving managerial decision making abilities for optimal organizational performance. |

| **Learning Resources:** | |
|---|---|
| 1 | Khan M.Y. and Jain P.K.: Management Accounting: Tata Mc-graw-Hill Publishing Co. Ltd., New Delhi. |
| 2 | Kaplan R.S. and Atkison A.A, Advanced Management Accounting: Prentice India International. |
| 3 | Gupta S.P.: Management Accounting, Sahitya Bhawan, Agra |
| 4 | Goyal Manmohan : Principles of Management Accounting, Sahitya Bhawan, Agra. |
| 5 | Singhavi N.P., Dr. Tated R.M., Dr. Chandak S.S. & Dahake R.R.: Management Accounting, Himalaya Publishing House , New Delhi |

| **Corresponding NPTEL/SWAYAM Courses:** | | | |
|---|---|---|---|
| **Sl. No.** | **Course Name** | **Instructor Name** | **Host Institute** |
| 1 | Management Accounting | Anil K. Sharma | IIT Roorkee |
| | Course Link: https://nptel.ac.in/courses/110107127 | | |

**OR,**

| **Course Name**: | **Recruitment and Selection** | | |
|---|---|---|---|
| **Course Code**: | BBA-MJ-HR-701 | **Category:** | Management Science Course |
| **Semester**: | 7th SEM | **Credit:** | 4 |
| **L-T-P**: | 3-1-0 | **Pre-Requisites:** | Basic knowledge of human resource management |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To provide a foundational understanding of recruitment |
| 2 | To equip students with the knowledge and skills required for effective job analysis |
| 3 | To develop a clear understanding of the selection process. |
| 4 | To familiarize students with induction, orientation, and the legal aspects of recruitment and selection |

**Course Contents:**

| **Module No.** | **Description of Topic** | **Contact Hrs.** |
|---|---|---|
| 1. | Recruitment: -Meaning, Objectives, Scope & Definition, Importance and relevance of Recruitment. Source or Type of Recruitment, Technique of Recruitment-Traditional Vs Modern Recruitment, Evaluation of Recruitment-Outsourcing Programme | 10 |
| 2. | Job Analysis: Job Description and Job Specification, Role of Employer Branding in Recruitment, Use of Technology in Recruitment (ATS, AI tools), Role of Consultants and Employment Exchanges, Designing Recruitment Advertisements | 10 |
| 3. | Selection: Concept of Selection, Criteria for Selection, Process, Screening-Pre and Post Criteria for Selection, Steps of Selection. Interviewing-Types and Guidelines for Interviewer & Interviewee, Types of Selection Tests, Effective Interviewing Techniques. Selection Hurdles and Ways to Overcome Them | 10 |
| 4. | Induction and legal aspect of recruitment: Concept, Types-Formal /Informal, Advantages of Induction. How to make Induction Effective. • Orientation & On boarding-Programme and Types, Process. Legal Framework Related to Recruitment and Selection in India, Equal Employment Opportunity (EEO) and Diversity Hiring. | 10 |
| **Total** | | **40L** |

**Course Outcomes:**

| After completion of the course, students will be able to: | |
|---|---|
| 1 | Demonstrate comprehensive knowledge of recruitment principles |
| 2 | Analyze and design key components of job analysis |
| 3 | Effectively apply the selection process |
| 4 | Explain and implement effective induction, orientation, and onboarding programs |

| **Learning Resources:** | |
|---|---|
| 1 | "Human Resource Management" by V.S.P. Rao |
| 2 | "Recruitment and Selection" by Gareth Roberts (CIPD Publication) |
| 3 | "Recruitment and Selection: Theories and Practices" by Dipak Kumar Bhattacharyya |
| 4 | "Human Resource Management: Text and Cases" by K. Aswathappa |

| **Alternative NPTEL/SWAYAM Courses:** | | | |
|---|---|---|---|
| **Sl. No.** | **NPTEL Course Name** | **Instructor** | **Host Institute** |
| 1 | Talent Acquisition & Management | Prof. Santosh Rangnekar | IIT Roorkee |
| | Course Link: https://nptel.ac.in/courses/110107152 | | |

| **Course Name**: | **Business Intelligence** | | |
|---|---|---|---|
| **Course Code**: | BBA-MJ-702 | **Category:** | Information Technology Course |
| **Semester**: | 7th SEM | **Credit:** | 4 |
| **L-T-P**: | 2-2-0 | **Pre-Requisites:** | The basic concept of Analytics |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To develop a foundational understanding of Business Intelligence (BI) |
| 2 | To enable proficiency in the core components and tools of Business Intelligence |
| 3 | To guide students through the complete lifecycle of a BI project |
| 4 | To familiarize students with data science integration, data visualization, and reporting techniques in BI |

**Course Contents:**

| Module No. | Description of Topic | Contact Hrs. |
|---|---|---|
| 1. | Introduction to Business Intelligence: BI concept, BI architecture, BI in today's perspective, BI Process, Applications of BI like Financial analysis, statistical analysis, sales analysis, CRM, result pattern and ranking analysis, Balanced Scorecard, BI in Decision Modelling: Optimization, Decision making under uncertainty. Ethics and business intelligence. | 6L |
| 2. | Elements of Business Intelligence: Reports & adhoc queries; Analyse OLAP data;Dash boards& Scorecards development, Metadata Models; Automated tasks & events; Mobile& disconnected BI. | 6L |
| 3. | Building the BI Project: Planning the BI project, Project Resources, Project Tasks, Risk Management, Cost-justification, Collecting User Requirements, Requirements-Gathering Techniques, Prioritizing & Validating BI Requirements, Changing Requirements, BI Design and Development, Best Practices, Post-Implementation Evaluations. | 6L |
| 4. | Data Science: The concept, process and typical tools in data science. Example of different algorithms i.e. segmentation, classification, validation, regressions, recommendations. | 5L |
| 5. | Data Visualization and Dashboard Design: Responsibilities of BI analysts, Importance of data visualization, types of basic and composite charts, dashboards. | 6L |
| 6 | Reporting authoring: Building reports with relational vs Multidimensional data models ; Types of Reports– List, crosstabs, Statistics, Chart, map, financial etc., Data Grouping & Sorting, Filtering Reports, Adding Calculations to Reports, Conditional formatting, Adding Summary Lines to Reports. | 6L |
| 7. | Future of Business Intelligence: Emerging Technologies, Machine Learning, Predicting the Future with the help of Data Analysis, BI Search & Text Analytics– Advanced Visualization– Rich Report, Future beyond Technology. | 5L |
| **Total** | | **40L** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | Summarise the concepts and components of Business Intelligence (BI). |
| 2 | Illustrate the use of technologies and tools related to BI |
| 3 | Outline the technological architecture that underpins BI systems. |
| 4 | Apply the use of BI for supporting decision-making in an organisation. |

| **Learning Resources:** | |
|---|---|
| 1 | Vercellis Carlo: Business Intelligence, Wiley India Pvt. Ltd. |
| 2 | Meenakshi Gupta: Business Intelligence and Applications, BUUKS. |
| 3 | Dr.Manoj Kumar Patel: Business Intelligence in Decision Making , BUUKS |
| 4 | Surma Jerzy: Business Intelligence, Business Expert Press. |

| | |
|---|---|
| 5 | Sharda Ramesh: Business Intelligence and Analytics, Pearson. |

| **Alternative NPTEL/SWAYAM Courses:** | | | |
|---|---|---|---|
| **Sl. No.** | **NPTEL Course Name** | **Instructor** | **Host Institute** |
| 1 | Business Intelligence & Analytics | Prof. Saji k Mathew | IIT, Madras |
| | Course Link: https://onlinecourses.nptel.ac.in/noc26_cs64/preview | | |

| **Course Name**: | **Programming with R** | | |
|---|---|---|---|
| **Course Code**: | PE-BBA-MI-701 | **Category:** | Information Technology Course |
| **Semester**: | 7thSEM | **Credit:** | 2 |
| **L-T-P**: | 2-0-0 | **Pre-Requisites:** | Basic computer literacy |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To understand the Fundamentals of data types and operators. |
| 2 | To understand the concepts about conditional statements in R. |
| 3 | To understand and implement String, List, Matrix, Vectors |
| 4 | To understand packages used for visualization in R. |

| **Course Contents: (Choose 10 experiments from the following)** | | |
|---|---|---|
| **Module No.** | **Description of Topic** | **Contact Hrs.** |
| 1 | **Introduction to Data Science and Data Analytics**: Data: Types of data, scales of measurement. Univariate Data: Descriptive measures related to univariate metric data. Bivariate Data: Descriptive measures related to bivariate metric data. Correlations, linear and polynomial regressions. Descriptive measures related to bivariate. Categorical data: Measures of associations in a contingency table. Exploratory data analysis: Philosophy of EDA, Basic tools of EDA (plots, graphs, and summary statistics).Data Visualization: Basic principles, ideas, and tools for data visualization. Visualization of qualitative, quantitative, temporal, spatial, and panel data. Introduction to Data Analysis Tools. | 4L |
| 2. | **Basics of R Programming:** What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed. Packages (), package Description (), help (), find. Package (), library() - Input and Output – Entering Data from the keyboard – Printing fewer digits or more digits – Special Values | 6L |

| | | |
|---|---|---|
| | functions: NA, Inf and –inf.<br>R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R - Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - R Operators: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - R Decision Making: if statement, if – else statement, if – else if statement, switch statement – R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement. | |
| 3. | **R-Function:** Function definition, Built-in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting - R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels gl().<br>String functions: grep(), nchar() ,paste(), sprintf(), substr(), strsplit(), regex() gregexpr(), toupper(),tolower(), paste() | 8L |
| 4. | **Introduction to different packages of R:**ggplot2, ggraph, dygraphs, MASS, tidyquant, dplyr. | 2L |
| **Total** | | **20L** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | To understand Data analytics, its types and its applications and to get knowledge about R studio installation and R programming fundamental concepts like variable, data types, commands. |
| 2 | To apply the basics in R programming in terms of functions, loops, decision making and data structure. |
| 3 | To design various experiments based on graphs and charts for data visualization in R programming. |
| 4 | To apply of statistical computations for data analytics. |

| **Learning Resources:** | |
|---|---|
| 1 | Jared P Lander; R for Everyone Addison Wesley Publication |
| 2 | Sandip Rakshit; R Programming for Beginners Mc Graw Hill |
| 3 | C Raju; Data Science: A Beginner's Guide Penguin Business |
| 4 | V K Jain; Data Science and Analytics (with Python, R and SPSS Programming) Khanna Books |

| Alternative NPTEL/SWAYAM Courses: | | | |
|---|---|---|---|
| **Sl. No.** | **NPTEL Course Name** | **Instructor** | **Host Institute** |
| 1. | Foundations of R software | Prof. Shalabh | IIT Kanpur |
| | Course Link: https://nptel.ac.in/courses/111104160 | | |

| **Course Name**: | **Programming with R Lab** | | |
|---|---|---|---|
| **Course Code**: | PE-BBA-MI-791 | **Category:** | Information Technology Course |
| **Semester**: | 7$^{th}$SEM | **Credit:** | 2 |
| **L-T-P**: | 0-0-4 | **Pre-Requisites:** | Basic computer literacy |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:60 | Continuous Assessment:35 | Attendance:05 |

| Course Objectives: | |
|---|---|
| 1 | To understand the Fundamentals of data types and operators. |
| 2 | To understand the concepts about conditional statements in R. |
| 3 | To understand and implement String, List, Matrix, Vectors |
| 4 | To understand packages used for visualization in R. |

| Course Contents: (Choose 10 experiments from the following) | | |
|---|---|---|
| **Module No.** | **Description of Topic** | **Contact Hrs.** |
| 1 | **Introduction to Data Science and Data Analytics**: Data: Types of data, scales of measurement. Univariate Data: Descriptive measures related to univariate metric data. Bivariate Data: Descriptive measures related to bivariate metric data. Correlations, linear and polynomial regressions. Descriptive measures related to bivariate. Categorical data: Measures of associations in a contingency table. Exploratory data analysis: Philosophy of EDA, Basic tools of EDA (plots, graphs, and summary statistics).Data Visualization: Basic principles, ideas, and tools for data visualization. Visualization of qualitative, quantitative, temporal, spatial, and panel data. Introduction to Data Analysis Tools. | 6P |
| 2. | **Basics of R Programming:** What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed. Packages (), package Description (), help (), find. Package (), library() - Input and Output – Entering Data from the keyboard – Printing fewer digits or more digits – Special Values functions: NA, Inf and –inf. | 8P |

| | | |
|---|---|---|
| | R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R - Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - R Operators: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - R Decision Making: if statement, if – else statement, if – else if statement, switch statement – R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement. | |
| 3. | **R-Function:** Function definition, Built-in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting - R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels gl().<br>String functions: grep(), nchar() ,paste(), sprintf(), substr(), strsplit(), regex() gregexpr(), toupper(),tolower(), paste() | 12P |
| 4. | **Introduction to different packages of R:**ggplot2, ggraph, dygraphs, MASS, tidyquant, dplyr. | 14P |
| **Total** | | **40P** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | To understand Data analytics, its types and its applications and to get knowledge about R studio installation and R programming fundamental concepts like variable, data types, commands. |
| 2 | To apply the basics in R programming in terms of functions, loops, decision making and data structure. |
| 3 | To design various experiments based on graphs and charts for data visualization in R programming. |
| 4 | To apply of statistical computations for data analytics. |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | To understand Data analytics, its types and its applications and to get knowledge about R studio installation and R programming fundamental concepts like variable, data types, commands. |

| | |
|---|---|
| 2 | To apply the basics in R programming in terms of functions, loops, decision making and data structure. |
| 3 | To design various experiments based on graphs and charts for data visualization in R programming. |
| 4 | To apply of statistical computations for data analytics. |

| **Learning Resources:** | |
|---|---|
| 1 | Jared P Lander; R for Everyone Addison Wesley Publication |
| 2 | Sandip Rakshit; R Programming for Beginners Mc Graw Hill |
| 3 | C Raju; Data Science: A Beginner's Guide Penguin Business |
| 4 | V K Jain; Data Science and Analytics (with Python, R and SPSS Programming) Khanna Books |

| **Course Name**: | **DBMS with SQL** | | |
|---|---|---|---|
| **Course Code**: | PE-BBA-MI-702 | **Category:** | Information Technology Course |
| **Semester**: | 7th SEM | **Credit:** | 2 |
| **L-T-P**: | 2-0-0 | **Pre-Requisites:** | The basic concept of Computer |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:70 | Continuous Assessment:25 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To equip students with the knowledge of database fundamentals, system architecture, data models, and the role of relational database in business systems. |
| 2 | To enlighten students with an idea of model real-world business scenarios using ER diagrams and apply normalization principles to ensure efficient data design |
| 3 | To develop proficiency of the students in SQL (DDL, DML, DCL/TCL), advanced query techniques, and basic PL/SQL for business data manipulation |
| 4 | To enable students to apply practical skills using RDBMS tools to design, query, manage transactional behavior, and perform performance enhancements. |

| **Course Contents:** | | |
|---|---|---|
| **Module No.** | **Description of Topic** | **Contact Hrs.** |
| 1 | **Module 1: DBMS Foundations & Modelling:** Basics: Data vs Information, File systems vs DBMS, advantages. DBMS architecture, data models (relational focus), DBA roles. Entity-Relationship concepts: entities, attributes, keys.ER diagrams, | 5L |

| | | |
|---|---|---|
| | relationship types (including weak entities).Schema–instance concepts, Three-schema architecture, data independence. | |
| 2 | **Module 2: Relational Algebra & Normalization:**<br>Relational algebra operations: SELECT, PROJECT, JOIN, UNION.<br>Mapping ER diagrams to relational schema.<br>Functional dependencies and normalization rationale.<br>Normal forms: 1NF, 2NF, 3NF, BCNF.<br>Decomposition and anomalies (insert, update, delete). | 5L |
| 3 | **Module 3: Core SQL & Business Queries:**<br>SQL basics: DDL, CREATE/ALTER/DROP, constraints.DML: INSERT, UPDATE, DELETE; basic SELECT with WHERE and ORDER BY. Aggregate functions (SUM, AVG, COUNT, MIN, MAX), GROUP BY, HAVING.JOIN types, nested queries, set operations, views. Basics of transactions: ACID properties, COMMIT, ROLLBACK. | 5L |
| 4 | **Module 4: Advanced SQL, RDBMS Tools & Modern Concepts:**<br>PL/SQL basics: stored procedures, functions, cursors, triggers.<br>Indexing strategies: B-tree, hashing, performance considerations.<br>Transaction concurrency: locking, isolation levels, deadlock handling.<br>Introduction to NoSQL: types, features, and when to use them.<br>Business case study: designing a database-driven mini project. | 5L |
| **Total** | | **20L** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | Articulate the advantages of DBMS over file systems, describe architecture, data models, and data integrity mechanisms |
| 2 | Design conceptual and logical database schemas through ER modeling and normalization up to 3NF/BCNF |
| 3 | Write and execute SQL queries including CRUD operations, joins, nested queries, views, aggregate functions, and transaction control |
| 4 | Employ advanced SQL techniques—triggers, stored procedures, indexing, concurrency control—and conceptualize NoSQL applicability in business contexts |

| **Learning Resources:** | |
|---|---|
| 1 | "Database System Concepts", by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill Education |
| 2 | "Fundamentals of Database System", by Ramez Elmasri, Shamkant B. Navathe, Pearson Education |
| 3 | "Database Management Systems", by Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education |

| | |
|---|---|
| 4 | "SQL, PL/SQL – The Programming Language of Oracle" by Ivan Bayross, BPB Publications |

| **Alternative NPTEL/SWAYAM Courses:** | | | |
|---|---|---|---|
| **Sl. No.** | **NPTEL Course Name** | **Instructor** | **Host Institute** |
| 1. | Data Base Management System | Prof. Partha Pratim Das, Prof. Samiran Chattopadhyay | IIT Kharagpur |
| | Course Link: https://onlinecourses.nptel.ac.in/noc26_cs39/preview | | |

| **Course Name**: | **DBMS with SQL lab** | | |
|---|---|---|---|
| **Course Code**: | PE-BBA-MI-792 | **Category:** | Information Technology course |
| **Semester**: | 7th SEM | **Credit:** | 2 |
| **L-T-P**: | 0-0-4 | **Pre-Requisites:** | The basic concept of Computer |
| **Full Marks:** | 100 | | |
| **Examination Scheme:** | Semester Examination:60 | Continuous Assessment:35 | Attendance:05 |

| **Course Objectives:** | |
|---|---|
| 1 | To equip students with the knowledge of database fundamentals, system architecture, data models, and the role of relational database in business systems. |
| 2 | To enlighten students with an idea of model real-world business scenarios using ER diagrams and apply normalization principles to ensure efficient data design |
| 3 | To develop proficiency of the students in SQL (DDL, DML, DCL/TCL), advanced query techniques, and basic PL/SQL for business data manipulation |
| 4 | To enable students to apply practical skills using RDBMS tools to design, query, manage transactional behavior, and perform performance enhancements. |

| **Course Contents:** | | |
|---|---|---|
| **Module No.** | **Description of Topic** | **Contact Hrs.** |
| 1 | **Module 1: DBMS Foundations & Modelling Practical :** Setup RDBMS (e.g., MySQL). Create databases and tables with primary/foreign keys. Draw ER diagrams via digital tools (e.g., Draw.io). Translate ER models into relational tables. Explore schema metadata using system tables. | 10P |

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| 2 | **Module 2: Relational Algebra & Normalization Practical :**<br>✓ Formulate queries using relational algebra.<br>✓ Convert ER diagrams into relational table schemas.<br>✓ Identify functional dependencies.<br>✓ Normalize sample unnormalized datasets to 3NF/BCNF.<br>✓ Design mini business database schema using normalization. | 10P |
| 3 | **Module 3: Core SQL & Business Queries Practical:**<br>✓ Execute table creation with constraints.<br>✓ Perform INSERT/UPDATE/DELETE operations.<br>✓ Query with filters, sorting, and aggregates.<br>✓ Build queries involving joins, nested queries, and views.<br>✓ Run transaction scenarios demonstrating rollback and commit. | 10P |
| 4 | **Module 4: Advanced SQL, RDBMS Tools & Modern Concepts Practical:**<br>✓ Create and test triggers and stored procedures for business rules.<br>✓ Build indexes and compare query performance.<br>✓ Simulate concurrency scenarios and lock contention.<br>✓ Explore simple NoSQL queries conceptually (e.g., in MongoDB).<br>✓ Capstone mini-project: design database for a business scenario (like inventory, sales). | 10P |
| **Total** | | **40P** |

| **Course Outcomes:** | |
|---|---|
| After completion of the course, students will be able to: | |
| 1 | Articulate the advantages of DBMS over file systems, describe architecture, data models, and data integrity mechanisms |
| 2 | Design conceptual and logical database schemas through ER modeling and normalization up to 3NF/BCNF |
| 3 | Write and execute SQL queries including CRUD operations, joins, nested queries, views, aggregate functions, and transaction control |
| 4 | Employ advanced SQL techniques—triggers, stored procedures, indexing, concurrency control—and conceptualize NoSQL applicability in business contexts |

| **Learning Resources:** | |
|---|---|
| 1 | "Database System Concepts", by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill Education |
| 2 | "Fundamentals of Database System", by Ramez Elmasri, Shamkant B. Navathe, Pearson Education |
| 3 | "Database Management Systems", by Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education |

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| 4 | "SQL, PL/SQL – The Programming Language of Oracle" by Ivan Bayross, BPB Publications |