# DR. B.C. ROY SOCIETY ENGINEERING

**An Autonomous Institute Approved by AICTE and affiliated to MAKAUT, West Bengal**

Fourth Semester Detailed Syllabus

# MASTERS OF BUSINESS ADMINISTRATION (2024-2026)

# FACULTY OF MANAGEMENT STUDIES

The second year (Second Semester) syllabus is unanimously accepted and approved in the second BoS meeting held in 26th March, 2025 Department of Faculty of Management Studies.

HoD, FMS
Dr. B. C. Roy Engineering College, Durgapur

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1. **Course Prerequisite:**
   - Basic Management Principles
   - Fundamentals concepts of Economics such as demand-supply analysis and cost structures
   - Knowledge of basic Mathematical and Analytical Skills
   - Financial and Accounting Basics and basics of Operations and Production Management

2. **Course Learning Objectives:**
   By the end of the course, students will:
   - **Understand** the fundamentals of project management, including project life cycle phases, feasibility studies, and the role of entrepreneurship in economic development.
   - **Apply** project planning and scheduling tools such as Work Breakdown Structure (WBS), Gantt Charts, CPM, and PERT to design and manage project timelines and resources.
   - **Analyze** investment opportunities and evaluate projects using financial and economic appraisal methods under conditions of certainty and uncertainty.
   - **Evaluate** project performance through monitoring techniques, cost-benefit analysis, and risk assessment to improve project execution and control.
   - **Design** entrepreneurial projects by integrating market analysis, financial structuring, leadership skills, and implementation strategies for effective business ventures.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**
   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)
   - Assignment: 10 Marks
   - Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name : Project Management and Entrepreneurship Development**
   **Course Code: MB [401]**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Hours |
|---|---|---|
| 1 | **Project Management** : Definitions of Project and Project Management, Issues and Problems in Project Management, Project Life Cycle - Initiation/ Conceptualization Phase, Planning Phase, Implementation/Execution Phase, Closure/Termination Phase | 4L |
| 2 | **Project Feasibility Studies**: Pre-Feasibility and Feasibility Studies, Preparation of Detailed Project Report, Technical Appraisal, Economic/Commercial/Financial Appraisal including Capital Budgeting Process, Social Cost Benefit Analysis | 4L |
| 3 | **Project Planning:** Importance of Project Planning, Steps of Project Planning, Project Scope, Work Breakdown Structure (WBS) and Organization Breakdown Structure (OBS), Phased Project Planning | 4L |
| 4 | **Project Scheduling and Costing**: Gantt chart, CPM and PERT Analysis, Identification of the Critical Path and its Significance, Calculation of Floats and Slacks, Crashing, Time Cost Trade-off Analysis, Project Cost Reduction Methods | 6L |
| 5 | **Project Monitoring and Control:** Role of Project Manager, MIS in Project Monitoring, Project Audit | 2L |
| 6 | **Introduction**: Concept of Entrepreneurship; Role of entrepreneurship in economic development; Factors impacting emergence of entrepreneurship; Types of entrepreneurs; Characteristic of successful entrepreneurs **Entrepreneurship Development and Leadership**: Types of startups; Entrepreneurial training; Entrepreneurship Development Programmes; Characteristics of entrepreneurial leadership, Components of entrepreneurial leadership | 6l |
| 7 | **Identification of Investment Opportunities**: Project ideas generation and screening. Phases in Project Management, Project feasibility study, Appraisal criteria and process; Methods of appraisal under certainty, uncertainty and risk. | 4L |
| 8 | **Market and Demand Analysis**: Sources of information – primary and secondary; Demand forecasting and market planning; Technical analysis: Materials and inputs; Production technology; Product mix; Plant location and layout; Selection of plant and equipment. Unit | 4L |
| 9 | **Financial Analysis**: Cost of project and means of financing; Major cost components; Planning capital structure; Financing schemes of financial institutions. | 4L |
| 10 | **Social Cost Benefit Analysis**: Meaning and methodology; L & M and UNIDO approach; SCBA in India Project implementation; PERT and CPM. Problem of time and cost overrun, Project implementation practices in India. Project Review/control – Evaluation of Project. | 2L |

### 5. Suggested Readings

1. Innovation and Entrepreneurship by Drucker, P.F.; Harper and Row

2. Business, Entrepreneurship and Management: Rao, V.S.P. Vikas

3. Entrepreneurship: Roy Rajeev; OUP.

4. Text Book of Project Management: Gopalkrishnan, P. and Ramamoorthy, V.E.; McMillan

5. Project Management for Engineering, Business and Technology: Nicholas, J.M., and Steyn, H.; PHI

6. Project Management: The Managerial Process: Gray, C.F., Larson, E.W. and Desai, G.V.; MGH

7. Gupta, CB and P Srinivasan, Entrepreneurship Development, Sultan Chand and Sons, New Delhi ·
8. Arya, K. (2016). Entrepreneurship: Creating and Leading an Entrepreneurial Organization. Pearson.

9. Hisrich, R. D., Shepherd, D. A. & Peters, M. P. (2016), Entrepreneurship, McGraw-Hill Education.

### 6. Course Outcomes:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | Understand project management concepts and apply planning tools like WBS, Gantt charts, CPM, and PERT for effective project management. | Discuss, Determine, Examine | Understand and Apply |
| **CO 2** | Analyze project feasibility and evaluate monitoring, control, and cost optimization methods for project success. | Estimate, Evaluate | Analyze and evaluate |
| **CO 3** | Understand entrepreneurship concepts and apply project management techniques like feasibility studies, market analysis, and investment opportunity identification. | Discuss, Determine, Examine | Understand and Apply |
| **CO 4** | Analyze project finances and evaluate cost-benefit analysis and implementation practices for successful execution. | Estimate, Evaluate | Analyze and evaluate |

### 7. Mapping of course outcomes to module / course content

| Module | CO1 | CO2 | CO3 | CO4 |
|---|---|---|---|---|
| 1 | 3 | - | - | - |
| 2 | 2 | 3 | - | - |
| 3 | 3 | - | - | - |
| 4 | 3 | 3 | - | - |
| 5 | - | 3 | - | - |
| 6 | - | - | 3 | - |
| 7 | - | 2 | 3 | - |
| 8 | - | - | 3 | - |
| 9 | - | - | - | 3 |
| 10 | - | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | 3 | 3 | 3 | 1 | 1 | 1 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 1 | 1 | 2 |
| CO3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 |
| CO4 | 3 | 3 | 3 | 1 | 1 | 1 | 2 |

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**Course Name: Consumer Behaviour**
**Course Code: MM-401**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**

   • Basic understanding of **management principles** (e.g., organizational behaviour, business environment).

   • Familiarity with the **functional areas** in marketing, operations (sales and distribution, promotions etc.)

2. **Course Learning Objectives:**

   After completion of the course, the students will be able to:

   • **Understand** the foundational concepts of psychology, sociology, and behavioral theories as applied in the consumer decision-making process.
   • **Analyze** consumer behavior through decision-making models, motivation theories, perception processes, personality, and attitude frameworks to interpret purchasing patterns.
   • **Evaluate** the influence of family, reference groups, culture, and technological evolution on consumer behavior in varied socio-economic and cultural contexts using theoretical frameworks**.**

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   • Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   • Assignment: 10 Marks

   • Attendance: 5 Marks

   **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name: Consumer Behaviour**
   **Course Code: MM 401**
   **Hours per Week:** 4L
   **Credits:** 4

| **Module I** | | |
|---|---|---|
| 1 | The basics of psychology and experimental psychology as applied in the marketing domain | **4L** |
| 2 | The basics of sociology and social psychology as applied in the marketing domain | **4L** |
| 3 | Consumer motivation, the interdependence of needs and goals, role of defense mechanisms in understanding consumer's needs, motivations and arousals, types of needs, self and self-image, extended self, multiple selves, virtual self, gender roles | **4 L** |

| 4 | Consumer decision process: various models of consumer decision making, decision making as problem-solving, four views of consumer decision making – economic, passive, cognitive, and emotional, types of the decision process - complex decision making, variety seeking, impulse buying, loyalty, degree of involvement in buying, use value and exchange value, | 4 L |
|---|---|---|
| | value – a Marxist perspective, consuming and possessing, consumption of Veblen goods, role of technology in consumer decision making, sustainable consumption | |
| 5 | SOBC theory, sensation, perception, perceptual selection, selective perception, perceptual organization, figure and ground, stereotypes, perceptual mapping ethics and consumer perception, personality and attitude formation, structural models of attitude, cognitive dissonance theory, psychoanalysis of consumption of common products and services | 4 L |
| 6 | Consumer learning and memory: information acquisition and processing, cognitive learning and other theories of learning, memory processes, recognition and recall, the foundations of behaviourism (psychology) and behaviouralism (political science), the basics of political economic behaviourism and analytics (Kahneman Tversky and functional equations), introduction to consumer research and analytics | 6 L |
| | **MODULE II** | |
| 7 | Concept of family, types of families, socialization of family members, family decision- making – husband-wife decision making, the role of children in decision making, family life cycle, changing role of women, effect of technology in family's consumption basket, old and new SEC classification, urban and rural SEC grid, ISEC and new consumer classification system (NCCS) | 4 L |
| 8 | Reference Groups, their types, and influence on consumer decisions, friendship groups, shopping groups, work groups, Formation of the leisure class and affluent society, conspicuous consumption and conspicuous leisure, invidious distinction, canons of pecuniary taste, economic theory of woman's dress, opinion leadership, word of mouth, intergenerational socialization | 4 L |
| 9 | Culture, subculture, and cross-culture– Consumer theories from sociology and anthropology – consumerism, socialism, communism, and democracy, the role of technology in modifying consumption patterns, technological rationality, application of Hofstede's 5 cultural dimensions in understanding consumer behavior | 4 L |
| 10 | Case Studies on Consumer Behaviour | 2 L |

### 5. Suggested Readings:

**Text Book (TB)**

1. Shiffman & Kanuk - Consumer Behaviour. Pearson Education
2. Satish K. Batra & S.H.H. Kazmi-"Consumer Behaviour: Text & Cases"

**Reference Book (RB):**
1. Thorstein Veblen - The Theory of the Leisure Class.
2. Geert Hofstede - Culture's Consequences.
3. S. Ramesh Kumar -"Consumer Behaviour: Insights and Applications"

### 6. COURSE OUTCOMES

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO 1 | **Understand** the foundational concepts of psychology, sociology, and behavioral theories as applied in the consumer decision-making process. | Comprehend Articulate, Interpret | Understand |

| | | | |
|---|---|---|---|
| CO 2 | **Analyze** consumer behavior through decision-making models, motivation theories, perception processes, personality, and attitude frameworks to interpret purchasing patterns. | Examine, Compare, Contrast | Analyze |
| CO 3 | **Evaluate** the influence of family, reference groups, culture, and technological evolution on | Assess, | Evaluate |
| | consumer behavior in varied socio-economic and cultural contexts using theoretical frameworks**.** | Appraise, Critique | |

7. **Mapping of course outcomes to module / course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | - | 3 | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | - | 3 |
| 8 | - | - | 3 |
| 9 | - | - | 3 |
| 10 | 3 | 3 | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

**Course Name: B2B Marketing**
**Course Code: MM-402**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**
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1. **Course Prerequisite:**
   Basic understanding of Marketing Management concepts
   Knowledge of Consumer Behaviour principles
   Familiarity with fundamentals of Business Strategy and Market Research

2. **Course Learning Objectives:**
   By the end of the course, students will:
   Understand and analyze the unique characteristics and dynamics of business-to-business (B2B) markets.
   Evaluate organizational buying behaviour and apply models relevant to B2B contexts.
   Develop and apply appropriate strategies for segmenting, targeting, positioning, pricing, distribution, and communication in B2B markets.
   Assess the role of technology, global trade, and emerging trends in shaping B2B marketing strategies.
   Formulate integrated marketing strategies for domestic and international B2B markets through case analysis.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

   **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name: B2B Marketing**
   **Course Code : MM [402]**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Lectures |
|---|---|---|
| 1 | Business marketing concepts, business vs. Consumer marketing, economics of industrial demand, types of industrial markets, types of business customers, classifying industrial products and services, business customers' purchase orientations, organizational procurement characteristics, environment analysis in business marketing, the role of strategy. | **2L** |
| 2 | Organizational buying process, types of purchases/buying situations, buying centre concept, inter personal dynamics of business buying behaviour, roles of buying centre, conflict resolution in decision, the webster and wind model of organizational buying behaviour, ethics in purchasing. | **4L** |

| | | |
|---|---|---|
| 3 | Differences between B2C and B2B marketing research, sales forecasting approaches, top-down, bottom-up approaches, industrial marketing analytics. | **4L** |
| 4 | Segmenting, targeting and positioning of business market, value based segmentation, model for segmenting the organizational market. | **4L** |
| 5 | Classification of the product types; the life cycle of the product; services and management products; strategies for established products. Product policy of new product development: strategies for the development of new products; marketing systems; marketing of engineering services | **4L** |
| 6 | Nature of business marketing channels, intermediaries, direct and indirect channels, channel objectives, channel design, managing channel members, selection and motivation of channel members, channel conflicts, international logistics, global supply chain management, international trade analytics | **4L** |
| 7 | Price determinants, factors that influence the pricing strategies, pricing methods, concept of learning curves, pricing strategies, pricing policies, terms of payment, competitive bidding, leasing, factoring in exchange rate fluctuations | **4L** |
| 8 | Communication objectives, role of personal relation, advertising, sales promotion in industrial markets, trade shows and exhibitions, overseas communications | **4L** |
| 9 | Personal selling, steps involved in b2b personal selling, process of tendering, key account management, managing the industrial sales force, organizing and controlling the industrial sales force activity, planning for sales force deployment. | **4L** |
| 10 | Business-to-business forms of e-commerce, models for b2b ecommerce, marketing strategy for the electronic market place. Case Studies in the Indian context – Domestic firms, Indian MNCs and Multinationals operating in India through JVs and/or FDIs, Innovations in Marketing and Strategy | **6L** |

### 5. Suggested Readings:

**Text Book (TB)**

1. Reeder, R.R., Brierty, E.G., Reeder, B.H. (1991). Industrial Marketing: Analysis, Planning, and Control. Prentice Hall. ISBN 9780134571102

**Reference Book (RB):**

1. Hutt, M.D., Sharma, D., Speh, T.W. (2014). B2B Marketing: A South-Asian Perspective. Cengage Learning India Pvt. Ltd.. ISBN 9788131520796

### 6. COURSE OUTCOMES

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | Analyze the key differences between business and consumer marketing and apply business marke in concepts to various industrial contexts. | Organize, Compare, Contrast | Analyze |
| **CO 2** | Evaluate organizational buying processes, market segmentation strategies, and marketing channel decisions in business markets. | Assess, Compare Explain | Evaluate |

| CO 3 | Design appropriate marketing strategies for B2B markets, including pricing, communication, and sales force management, considering global and technological dimensions. | Develop, Construct, Discuss | Create |
|------|------|------|------|
|      |      |      |      |

7. **Mapping of course outcomes to module / course content**

| Module | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1      | 3   | -   | -   |
| 2      | -   | 3   | -   |
| 3      | 3   | -   | -   |
| 4      | -   | 3   | -   |
| 5      | -   | 3   | -   |
| 6      | -   | 3   | -   |
| 7      | -   | -   | 3   |
| 8      | -   | -   | 3   |
| 9      | -   | -   | 3   |
| 10     | -   | -   | 3   |

8. **Mapping of the Course outcomes to Program Outcomes**

|     | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|-----|------|------|------|------|------|------|------|
| CO1 | 2    | 3    | 3    | 1    | 3    | 3    | 3    |
| CO2 | 3    | 3    | 2    | 2    | 2    | 2    | 2    |
| CO3 | 3    | 3    | 3    | 3    | 1    | 3    | 3    |

**Course Name: Services Marketing**
**Course Code: MM-403**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**
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1. **Course Prerequisite:**

   - Basic knowledge of Marketing Management concepts

   - Understanding of fundamental marketing mix and consumer behaviour

2. **Course Learning Objectives:**
   By the end of the course, students will:

   - Understand the unique characteristics and concepts of services marketing

   - Analyze service strategies for positioning and competitive advantage

   - Apply frameworks for service design, delivery, and communication

   - Evaluate the role of people, processes, and physical evidence in service delivery

   - Measure and manage service quality for enhancing customer satisfaction

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

     **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name : Services Marketing**
   **Course Code : MM [403]**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Lectures |
|---|---|---|
| 1 | Service Concept: Definition, Characteristics of services, Tangibility continuum, Marketing mix for services, Different types of service sectors – traditional and new, Service experience– moments of truth, zone of tolerance | 6L |
| 2 | Service Strategy Planning: Understanding the customer and competition, Positioning services, Service triangle concept, Pyramid model, Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology | 4L |
| 3 | Creating the Service Product: Creating service product, Customer value hierarchy, Flower of service, Service product mix, Branding service products | 4L |

| 4 | Service Marketing Pricing and Communications: Approaches to pricing of services, Elements of promotional mix for services | 4L |
|---|---|---|
| 5 | Designing and Managing Service Demand and Capacity: Designing service delivery system, Service blue printing, Customer as co-producer, Capacity constraints, Demand patterns, Strategies for matching capacity and demand, Wait lines and reservations | 4L |
| 6 | Planning the Service Environment: Physical evidence, Servicescapes - types and role, customer response to environment, guidelines for servicescape strategies | 2L |
| 7 | Managing People: Critical importance of service employees, Problems and difficulties of boundary-spanning roles, Strategies for delivering service quality through people, Service leadership and culture | 4L |
| 8 | Service Quality: Service quality, Integrated Gap model - to identify and correct quality problems, Measuring and improving service quality, e-Service Quality, Customer Satisfaction through Importance-Performance Analysis | 6L |
| 9 | Different Services: Self-Service Technologies (SSTs), Nature and characteristics of financial, hospitality, health-care, educational & professional, logistics, entertainment services and their respective marketing mix analysis | 6L |

### 5. Suggested Readings:

**Text Book (TB)**

1. Rajendra Nargundkar, Services Marketing: Text & Cases, Tata McGraw-Hill Publishing Company, New Delhi, 2008
2. Apte, G.: Service Marketing; OUP

**Reference Book (RB):**

1. Zeithaml,V.A., Bitner, M J, Grembler, D.D. &Pandit, A.: Service Marketing;, TMH

### 6. COURSE OUTCOMES

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO 1 | **Explain** fundamental concepts, characteristics, and frameworks in services marketing | Assess, Compare, Conclude | Evaluate |
| CO 2 | **Apply** service marketing strategies for product design, pricing, communication, delivery, and managing people and environment. | Design, Develop, Propose | Apply |
| CO 3 | **Analyze** service quality, customer satisfaction, and specialized service sectors using appropriate models and tools | Compare, Contrast, Examine | Analyze |

### 7. Mapping of course outcomes to module / course content

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | - | 3 | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |

| | | | |
|---|---|---|---|
| 7 | - | - | 3 |
| 8 | - | - | 3 |
| 9 | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 1 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |

**Course Name: Retail Marketing**
**Course Code: MM-404**

**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]

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1. **Course Prerequisite:**

   Basic knowledge of Marketing Management and Consumer Behaviour
   Familiarity with Business Environment and Strategic Management concepts

2. **Course Learning Objectives:**

   By the end of the course, students will:

   - Understand the fundamentals of retail marketing and its strategic role in business growth

   - Analyze retail market dynamics, consumer behaviour, and retail operational strategies

   - Apply analytical tools, supply chain concepts, and digital techniques in retail marketing decisions

   - Evaluate global retail trends, emerging formats, and retail technology applications

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

     **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name : Retail Marketing**
   **Course Code : MM 404**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Lectures |
|---|---|---|
| 1 | Growth and importance of retail businesses, Strategic Retail Planning. Retail Organization, Models and Theory of Retail Development, Retail Formats, Rural Retailing, Environment and Legislation for Retailing | 4 L |
| 2 | Retail location research and techniques, Objectives of Store designing, Responsibilities of Store Manager, Store record and accounting system | 4 L |
| 3 | Logistic and Supply Chain Management, Inventory and Merchandise Analytics, a first look at general Retail Analytics | 2 L |
| 4 | Marketing and Strategic Management, Operations and finance in retailing, HRM in retailing, Mall Management, Relationship Management, Brand Management, Social Marketing in Retailing | 6 L |
| 5 | Advertising communications and promotion, Promotion Impact, Tactical analysis, Consumer and Retail Sales promotion techniques. | 4 L |

| 6 | International Marketing Research and Information System, | 4 L |
| | Market Analysis, Motives of International Retailing, International Retail Environment and Structure, Analysis of Retailing in Global Setting – methods and competition | |
| 7 | Understanding Consumer and Market Segment, Consumer Behaviour and Marketing Strategy, Consumer Perception, Self Concept, Relevance of Culture, Buying Decision, Opinion Leadership, Implications of Personal Influences | 6 L |
| 8 | Network, Challenges, Forecasting, Sourcing and Vendor Selection, Routing and Route sequencing, Inventory Management, Lead Time uncertainty and Product Availability, Cross Docking and Collaborative Planning | 4 L |
| 9 | A second look at retail analytics, the use of IT (and MIS) in Retailing, Database Management, Data warehousing, Analysis of E – Retailing Strategies, Digital and Network marketing, In-store analytics tools, analysis of store-based and internet customer data | 4 L |
| 10 | Effective Management of Online catalogues, Direct Retailing | 2 L |

5. **Suggested Readings:**

**Text Book (TB)**

1. Bajaj , Tuli, & Srivastava ""Retail Management" Oxford University Press

**Reference Book (RB):**

1. Berman, Barry & Evance, J.R "Retail Management" Prentice Hall India

6. **COURSE OUTCOMES**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO 1 | **Analyze** the growth, structure, and strategic aspects of retail businesses in various contexts | Classify, Compare, Contrast | Analyze |
| CO 2 | **Evaluate** retail marketing strategies, supply chain decisions, and customer behavior insights for effective retail operations. | Explain, Interpret | Evaluate |
| CO 3 | **Apply** retail analytics, digital marketing, and technology-based solutions in both traditional and e-retail contexts | Build, Identify, Develop | Apply |

7. **Mapping of course outcomes to module / course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | - | 3 | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | - |
| 8 | - | 3 | - |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

**8. Mapping of the Course outcomes to Program Outcomes**

|      | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|------|------|------|------|------|------|------|------|
| CO1  | 3    | 2    | 3    | 1    | 3    | 3    | 3    |
| CO2  | 2    | 3    | 3    | 2    | 2    | 2    | 2    |
| CO3  | 3    | 3    | 3    | 3    | 2    | 2    | 3    |

**Course Name: Product and Brand Management**
**Course Code: MM-405**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**

   • Basic understanding of **management principles** (e.g., organizational behaviour, business environment, Business Laws).

   • Familiarity with the **functional areas** in marketing, operations (sales and distribution, promotions, Marketing Research and Analytics etc.)

2. **Course Learning Objectives:**

   After completion of the course, the students will be able to:
   • **Explain** the key concepts of product management including product planning, product strategies, design thinking, and innovation techniques for effective new product development**.**
   • **Analyze** the application of analytics and strategic models (such as FMEA, PDMA guidelines, and brand equity measurement tools) in evaluating product and brand performance across markets.
   • **Design** brand positioning strategies using perceptual mapping, brand identity frameworks (e.g., Aaker's and Kapferer's models), and communication tools including digital platforms and semiotics.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   • Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   • Assignment: 10 Marks

   • Attendance: 5 Marks

   **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Name: Product and Brand Management**
   **Course Code: MM 405**
   **Hours per Week:** 4L
   **Credits:** 4

| Module I | |
|---|---|
| 1 | Product Concepts: Product Mix concepts, Product Classification. Product Planning: Marketing Plan, Portfolio Analysis, Market Potential and forecasting | **4 L** |
| 2 | Product Market Strategies: New Product Development, Design and Concurrent Engineering, Relationship between Product Life Cycle and Innovation, Stage gate process: Stages and corresponding Strategies for NPD, Challenges of product development, Various approaches to NPD (process driven, voice of the customer, statistics-driven), NPD productivity – sales from new products/R&D spending, Main causes of product failure, Product Evaluation. | **4 L** |

| | | |
|---|---|---|
| 3 | Product Strategies and Analytics. Application of analytics in identifying product-opportunity gap, product management for competitive advantage, Understanding the role and responsibilities of the Product Development Management Association (PDMA), Product Evaluation, Product Line Management: Product Modification, | 4 L |
| | Product Line Extension, Product Proliferation, Product Featuring, Product Pruning. | |
| 4 | Design Thinking & Innovation: What is design thinking, Steps – empathize, define, ideate, prototype, test, problem-solving – the design thinking way, form-function debate, hierarchical organization of products, design helps in moving up the value chain, FMEA, human-centered design, Product psychology. | 4 L |
| 5 | Brands in the marketplace, POP and POD, Product vs brand, brand management as an activity, Evolution of brand manager system in a dynamic market environment, Understanding primary brand associations (verbal, visual, emotional and sensory), brand iceberg, and practical guidelines for eliciting deeply held brand associations for Brand building. | 4 L |
| **Module II** | | |
| 6 | Financial and Marketing Brand Equity: Concept of brand equity, Measuring brand equity, Different methods of its calculation, Trading and acquisition of brands, Customer-based brand equity (CBBE), Sources of brand equity. | 2 L |
| 7 | Brand Personality, Brand Identity: Concept, advantages, the importance of brand personality, Brand Personality Scales, 5 dimensions of JL Aaker's scale, Brand Identity, Understanding Kapferer's brand identity prism, Role of brand ambassadors. | 4 L |
| 8 | Brand Communication: brand communication strategy, mapping brand strategy with IMC, Media strategy. Social Media, Digital Marketing and PR for branding, a basic study of semiotics – sign, signifier and signified. | 4 L |
| 9 | Brand Architecture and Extensions: Relationship between brands of the same company, House of Brands vs Branded house, endorsed brands and sub-brands, handling a brand portfolio, Line and Category Extensions, Advantages & disadvantages of brand extensions, Forward and Reciprocal spillover, Evaluating brand extension opportunities | 4 L |
| 10 | Brand Positioning and Repositioning: Concept of perceptual maps, Positioning process and steps, Scope of brand repositioning exercise, From ad jingle to changing the business model, Relationship between Pricing and brand positioning Exploring the complex relationship, Cognitive and affective approaches, Challenges of maintaining a positioning-pricing relationship like value for money (VFM) or Luxury, Understanding cost behind the pricing, economic and social costs | 6 L |

5. **Suggested Readings:**

**Text Book (TB)**

1. Brian Lawley and Pamela Schure, Product Management for Dummies, Wiley
2. Chitale A. K. and Gupta Ravi, Product Policy And Brand Management Text And Cases,PHI

**Reference Book (RB):**
1. Kapferer, J.N. Strategic Brand Management, New York Free Press 1992.
2. Murphy John, A. Brand Strategy, Cambridge, The Desector Books, 1990.
3. Sengupta, Subroto, Brand Positioning.
4. Moorthe R.L.Y. Brand Management. The Indian Context, Vikas Publishing.
5. Kumar, Ramesh, S. Managing Indian Brands, Marketing Concepts and Strategies, Vikas Publishing.
6. Keller Kevin, Strategic Brand Management, Pearson Education

6. **COURSE OUTCOMES**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Explain** the key concepts of product management including product planning, product strategies, design thinking, and innovation techniques for effective new product development**.** | Comprehend Articulate, Interpret | Understand |

| CO 2 | **Analyze** the application of analytics and strategic models (such as FMEA, PDMA guidelines, and brand equity measurement | Examine, Compare, Contrast | Analyze |
|------|---|---|---|
|  | tools) in evaluating product and brand performance across markets. |  |  |
| CO 3 | **Design** brand positioning strategies using perceptual mapping, brand identity frameworks (e.g., Aaker's and Kapferer's models), and communication tools including digital platforms and semiotics. | Design, Develop, Conceptualize | Create |

### 7. **Mapping of course outcomes to module / course content**

| Module | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | 3 | - | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | - | 3 |
| 8 | - | - | 3 |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

### 8. **Mapping of the Course outcomes to Program Outcomes**

|  | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|------|------|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

**Course Name: Organizational Change & Development Management**

**Course Code: HR-401**

**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]
......................................................................................................

1. **CoursePrerequisite:**
   Students should possess a basic understanding of organizational behavior, management principles, and human resource functions. Familiarity with concepts of business strategy, leadership, and technological change will help in grasping the dynamics of organizational development and change in the digital age.

2. **CourseLearningObjectives:**
   By the end of the course, students will:

   - Understand the concepts, processes, and dimensions of organizational change and development (OD), including its relevance in the digital and sustainable context.

   - Examine the role of change agents, HR interventions, and resistance management in facilitating successful organizational transformation.

   - Analyze and apply OD strategies and interventions to promote continuous improvement, innovation, and long-term organizational effectiveness in dynamic environments.

3. **Teachingmethodologyandevaluationsystemforthecourse:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **EvaluationSystem– Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2**(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

     **End-SemesterExam    (60Marks)-**SummativeAssessment.

4. **CourseContent:**
   **Course Name: Organizational Change Development Management**
   **Course Code: HR [301]**
   **Hours per Week:** 4L
   **Credits:**4

| Sl. No. | Topic | 40L |
|---|---|---|
| 1 | Introduction: Organizational change & its nature, types, dimension, process, organizational life cycle, orientation of organizational development, OCD in digital transformation-- a sustainable way forward approach | 3L |

| | | |
|---|---|---|
| 2 | Green OCD: Green initiatives towards planned change & development for organizational effectiveness, linking change management with organizational learning | 2L |
| 3 | Change, Technology & Innovation: Work design, process re-engineering, OCD in the digital age navigating | 2L |
| 4 | Operational Agents of Change: Objectives, roles, operational types of change-- incremental & transformational change, five determinants of change (environment, technology, strategy, size, people) | 2L |
| 5 | Managing Resistance to Change: Objectives, importance, stimulating change dynamics, individual & organizational level of resistance, impact assessment | 4L |
| 6 | HR Interventions towards Change: Talent management, contingent workforce, decentralized work sites, digital workforce, workplace, digitalization in organization & its challenges | 2L |
| 7 | Foundations of OD: Concept, component, process, strategy, values, goals, assumptions of OD, role of work teams, recent trends | 6L |
| 8 | OD Interventions: Comprehensive & structural interventions (team, personal, interpersonal, group), the impact of digital technologies on the organizational development, OD interventions to adopt for digital transformation | 3L |
| 9 | Assessment & Implementation of OD: Process, execution, impact assessment in organizational performance | 4L |
| 10 | Power, Politics & OD: Key issues & conditions, mechanistic & organic, contingency approaches of OD | 4L |
| 11 | Managing OD: Structural, operational, maintenance components & processes, HR intervening system, evaluation & modification | 4L |
| 12 | OD Diagnostic Tools: OD methods & models of organizational autonomy, some Indian experiences | 2L |
| 13 | New Trends (Technology-OD Interface): Information-knowledge age, retaining talent, supplementary services, hybrid work culture, employee value proposition, how OD can succeed in the digital age | 2L |

5. **SuggestedReadings:**

**Text Book (TB)**

1. T. G. Cummins and C. G. Worley, Organizational Development and Change, SouthWestern College Publishing.
 2. A. H. Anderson and D. Barker. Effective Enterprise and Change Management, Oxford.
 3. French and Bell, Organization Development, Prentice Hall of India.
 4. Ramnarayan, Rao and Singh, Organizational Development— Interventions &Strategies, Response Books.

**ReferenceBook(RB):**

1. Nilakant and Ramnarayan, Managing Organisational Change, Response Books.
2. Pettigrew and Whipp, Change management for Competitive Success, Infinity Books.
3. K. Harigopal, Management of Organizational Change, Response Books.

6. **COURSEOUTCOMES**

| CO | Details/Statement | ActionVerb | KnowledgeLevel |
|---|---|---|---|
| **CO1** | Understand the fundamental principles, types, and models of organizational change and development. | Define, Outline, Illustrate | Understand |

| CO2 | Analyze the impact of technological, environmental, and human factors on change initiatives and OD interventions. | Examine, Differen | Analyze |
| --- | --- | --- | --- |
| | | tiate, Explain | |
| CO3 | Design and evaluate effective OD strategies and interventions to drive sustainable transformation in organizations. | Assess, Evaluate, Formulate | Create |

### 7. Mapping of course outcomes to module/course content

| Module | CO1 | CO2 | CO3 |
| --- | --- | --- | --- |
| 1 | 1 | - | - |
| 2 | 1 | - | - |
| 3 | 1 | - | - |
| 4 | 1 | - | - |
| 5 | - | 2 | - |
| 6 | - | 2 | - |
| 7 | - | 2 | - |
| 8 | - | 2 | - |
| 9 | - | 2 | - |
| 10 | - | 2 | - |
| 11 | - | - | 3 |
| 12 | - | - | 3 |
| 13 | - | - | 3 |

### 8. MappingoftheCourseoutcomestoProgramOutcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CO1 | 3 | 1 | 1 | 1 | 2 | 1 | 3 |
| CO2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

**Course Name: Human Resource Development**
**Course Code: HR-402**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**
...........................................................................................................

1. **CoursePrerequisite:**

    Students should have a basic understanding of Human Resource Management principles and organizational behavior. Prior exposure to workplace learning, training processes, or experience in HR-related roles will be beneficial for deeper engagement with the course content.

2. **CourseLearningObjectives:**

    By the end of the course, students will:

    - Understand the concepts, scope, and strategic processes of Human Resource Development (HRD) across organizational, individual, and team levels.

    - Evaluate training and non-training interventions for employee development, including modern delivery techniques and learning models.

    - Analyze and apply current trends and best practices in Learning & Development (L&D) to foster inclusive, digital, and performance-driven workplace cultures.

3. **Teachingmethodologyandevaluationsystemforthecourse:**

    **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
    **EvaluationSystem– Continuous Internal Assessment (Twice in a semester)**
    CIA1 and CIA2**(Total: 40 Marks each)**

- Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

- Assignment: 10 Marks

- Attendance: 5 Marks

    **End-SemesterExam    (60Marks)-**SummativeAssessment.

4. **CourseContent:**

    **Course Name:** Human Resource Development
    **Course Code:** HR 402
    **Hours per Week:** 4L
    **Credits:** 4

| Sl. No. | Topic | 40L |
|---|---|---|
| 1 | Human Resource Development: meaning, scope and purpose, HRD Process, Techniques of Assessment of HRD Needs - Organizational Analysis, Task Analysis, Individual Analysis. | 2L |
| 2 | Strategies of HRD : Organizational Development, Individual Development, Team Development, Organizational Culture Building. | 2L |

| 3 | Individual Development through Training : Designing Training Programme, On – the – job , Off – the – job , Methods – Lecture, Case Analysis, Role Play, Games, Exercises ; Role of Trainer, MDP, FDP, Professional, wellness, career development programs, Out Bound Training. | 6L |
|---|---|---|
| | | |
| 4 | Evaluation of Training: Need, principles, criteria, techniques of evaluation, Impediments to effective training, improving effectiveness of training. | 4L |
| 5 | Individual Development through Non-Training : Job Redesign Programme, Job Enlargement, Job Enrichment, Job Rotation, Suggestion Schemes, Career Planning, Counselling. | 4L |
| 6 | Team Development Programme : Methods and Schemes : Role of Staff & Line Managers in HRD, Quality Circle, Kaizen, Autonomous Small Group Activities. | 4L |
| 7 | Fundamentals of Employee Learning: Concept, process, types, principles, structure, functions of employee learning, role of HRM. | 2L |
| 8 | Learning Vs Development: Importance, benefits, differences, FIVE primary interventions of learning & development (need, assessment, design, evaluation, follow up). | 4L |
| 9 | Current Trends of Learning & Development: DEI (Diversity-Equity-Inclusion), Best Practices of current trends of employee L & D (Starbucks, Amazon, Google, Microsoft), developing new digital learning, different Learning Models (KIRKPATRICK, ADDIE, Bloom's Taxonomy, Merrill's principles instruction model). | 6L |
| 10 | Emerging Techniques of Learning/Training Delivery Techniques: Learning Technology Interface, blended learning, digital learning, personalized learning, micro learning, remote learning, gamification & other modern methods, challenges of learners & facilitators. | 6L |

5. **SuggestedReadings:**

**Text Book (TB)**

1. Employee Training and Development: Noe, R.A., Kodwani, A.D., McGraw Hill Education (India)
2. Psychology of Learning and Development: Mangal, S.K., Mangal, S., PrenticeHall
3. Every Trainer's Handbook: Agochiya, D., Sage Publications
4. Training for Development, Sahu, R.K., Excel Book

**ReferenceBook(RB):**

1. Training and Development Handbook: Graig, R.L., Mc Graw Hill international
2. Human Resource Development: Learning and Training for Individuals and Organizations: Wilson, J. P., Kogan Page
3. Training & Development: Janakiram, B., Biztrantra

6. **COURSEOUTCOMES**

| CO | Details/Statement | ActionVerb | KnowledgeLevel |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| **CO1** | Understand the fundamental concepts, scope, and techniques involved in Human Resource Development and employee learning. | Define, Outline, Illustrate | Understand |
| **CO2** | Analyze various HRD strategies and assess training and non-training methods for individual and team development. | Examine, Differen | Apply |
| | | tiate, Explain | |
| **CO3** | Design and evaluate effective learning and development interventions using modern techniques and apply best practices to build inclusive, future-ready organizations.. | Assess, Evaluate, Formulate | Create |

7. **Mapping of course outcomes to module/course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 1 | - | - |
| 2 | 1 | - | - |
| 3 | - | 2 | - |
| 4 | - | 2 | - |
| 5 | - | 2 | - |
| 6 | - | 2 | - |
| 7 | - | 2 | - |
| 8 | - | - | 3 |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

8. **MappingoftheCourseoutcomestoProgramOutcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 | 1 | 1 | 2 | 1 | 3 |
| CO2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

**Course Name: Contemporary Issues in Human Resource Management**

**Course Code: HR-403**

**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]
...................................................................................

1. **Course Prerequisite:**

   - Sound understanding of HRM.

   - Intermediate level understanding of Business Strategy.

   - Basic familiarity with all the primary verticals of business management.

2. **Course Learning Objectives:**
   After completion of the course, the students will be able to:

- **Explain** the strategic role of human resource management (HRM) in business alignment, digital transformation, workforce diversity, and organizational change.

- **Analyze** contemporary HR practices and challenges, including remote workforce management, gig economy dynamics, ethical issues, and legal compliance in HR operations.

- **Design** integrated HR strategies that enhance talent acquisition, employee engagement, and retention, while aligning with corporate social responsibility and evolving workplace trends.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve the stated objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks
     **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Name: Contemporary Issues in HR Management**
   **Course Code: HR 403**
   **Hours per Week:** 4L
   **Credits:** 4

| Module I | |
|---|---|
| 1 | Strategic HRM and Business Alignment Evolution of HRM to SHRM; Role of HR in strategic decision-making; HR Scorecard; HR Metrics and analytics | 4 |

| 2 | HR in the Digital Age - Digital transformation; HRIS; AI and ML in recruitment; automation in performance appraisal and training, talent management and the human capital management cycle | 4 |
|---|---|---|
| 3 | Workforce Diversity and Inclusion Managing multicultural and multigenerational workforce; gender equity; LGBTQIA+ inclusion; case laws on workplace equality | 4 |
| 4 | Employee Engagement and Experience Concepts of employee voice, well-being, engagement surveys, EX design; legal aspects of employee rights | 4 |
| 5 | Leadership, Culture and Change Management Organizational culture typologies; change management models (Kotter, Lewin); role of HR in managing transitions | 4 |
| **Module II** | | |
| 6 | Remote Work and Hybrid Workforce Management Virtual team management, flexi-work policies, performance tracking, legal implications of teleworking | 4 |
| 7 | Gig Economy and Contractual Workforces Rise of gig platforms; classification of workers; challenges in engagement, compensation, and social security provisions | 4 |
| 8 | Ethics and Corporate Social Responsibility in HR Ethical dilemmas in HR (hiring, layoffs, bias); CSR integration in HR practices; whistleblower protection laws | 4 |
| 9 | Talent Acquisition and Retention Strategies Modern sourcing techniques; employer branding; onboarding practices; retention metrics; legal aspects of recruitment | 4 |
| 10 | Contemporary Legal Issues in HRM Overview of labour codes (India); PoSH Act; data protection and privacy at the workplace; employee grievance redressal | 4 |

### 5. Suggested Readings:

**Textbooks**
1. Dessler, Gary. Human Resource Management (15th Edition), Pearson Education.
2. Armstrong, Michael. Armstrong's Handbook of Human Resource Management Practice, Kogan Page.

**Reference Books**
3. Deb, Tapomoy. Strategic Approach to Human Resource Management, Atlantic Publishers.
4. Monappa, Arun & Saiyadain, Mirza. Personnel Management, Tata McGraw Hill.
5. Srivastava, S. C. Industrial Relations and Labour Laws, Vikas Publishing House.

### 6. Course Outcomes

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|

| CO 1 | **Explain** the strategic role of human resource | Comprehend | |
|---|---|---|---|
| | management (HRM) in business alignment, digital transformation, workforce diversity, and organizational change. | Articulate, Interpret | Understand |
| CO 2 | **Analyze** contemporary HR practices and challenges, including remote workforce management, gig economy dynamics, ethical issues, and legal compliance in HR operations. | Examine, Compare, Contrast | Analyze |
| CO 3 | **Design** integrated HR strategies that enhance talent acquisition, employee engagement, and retention, while aligning with corporate social responsibility and evolving workplace trends. | Design, Develop, Conceptualize | Create |

7. **Mapping of course outcomes to module/ course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | 3 | - | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | |
| 8 | - | 3 | |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

**Course Name: Industrial Relations**

**Course Code: HR-404**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

……………………………………………………………………………………………….

1. **CoursePrerequisite:**
Students should have a basic understanding of principles of management, human resource management, and the socio-economic environment of industrial sectors. Prior exposure to Indian labour laws and workforce dynamics will aid in comprehending the complexities of industrial relations and related institutional frameworks.

2. **CourseLearningObjectives:**
By the end of the course, students will:

- Understand the structure, evolution, and key stakeholders of industrial relations in India, including the role of trade unions, employers, and the government.

- Examine the processes and mechanisms of dispute resolution, collective bargaining, and workers' participation in management.

- Analyze contemporary challenges in industrial relations such as modernization, automation, and labour welfare through relevant case studies and legal frameworks.

3. **Teachingmethodologyandevaluationsystemforthecourse:**
**Teaching methodology** – The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
**EvaluationSystem-** Continuous Internal Assessment (Twice in a semester)
CIA1 and CIA2 **(Total: 40 Marks each)**

- Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

- Assignment: 10 Marks

- Attendance: 5 Marks

**End-SemesterExam (60Marks)-**SummativeAssessment.

4. **CourseContent:**
**Course Name:** Industrial Relations
**Course Code:** HR 404
**Hours per Week:** 4L
**Credits:** 4

| Sl. No. | Topic | 40L |
|---|---|---|
| 1 | Industrial Relations: Overview, importance, Approaches to IR, Parties to IR, System Model of IR. | 4L |
| 2 | Industrial Workers in India: Rise of industrial workers in India, Profile of industrial workers, Problems of Industrial Workers (absenteeism, commitment, Work Ethics), Contemporary Issues in Industrial Relations. | 4L |

| 3 | Trade Unionism in India: Origin, Growth, Structure & Management of Trade Unions, Registration, Recognitions, Leadership, Trade Unionisms, Employer's Organizations in India, Managerial Associations. | 2L |
|---|---|---|
| 4 | Industrial Relations in India: Labour Policy in Five Year Plans, Tripartism, Role of Government & State, Role of Management, Role of Trade Unions. | 4L |
| 5 | Industrial Disputes: Causes, types, trends and settlement of disputes (internal options, third party machinery), Legislations affecting Industrial Relations. | 4L |
| 6 | Collective Bargaining: Theories, Prerequisites, Process, Negotiating skills and strategies, Agreement – content, validity, implementation, productivity, bargaining, growth of collective bargaining in India. | 4L |
| 7 | Workers' Participation in Management: Concept, purpose & practices in other countries, Workers' participation Schemes in India – Works Committee, Joint Management Council, Worker – Director, Shop Council & Joint Council, WPM, EPM, Problems & Prospects in India, Quality Circles – Concept & Practices in India. | 4L |
| 8 | Labour Welfare & Industrial Relations: Concept, purpose, statutory & non- statutory provisions, ILO Conventions and its application in India, Workers' Education Programmes in India. | 4L |
| 9 | Employee Discipline: Types, Misconduct, Disciplinary Action, Disciplinary Enquiry and Procedures, Grievance Handling and Redressal. | 4L |
| 10 | Rationalization, Modernization, Automation, Digitalization & Industrial Relations – Case Studies | 4L |

5. **SuggestedReadings:**

**Text Book (TB)**

1. Dynamics of Industrial Relations: Mamoria, C.B., Gankar S.V., Himalaya Pub.
2. Industrial Relations: Arun Monappa, Tata McGraw Hill.
3. Industrial Relations and Labour Law: Srivastava, S.C., Vikas Pub.

**ReferenceBook(RB):**

1. Human Resource Management: Gupta, C.B., Sultan Chand & Co.
2. Managing Industrial Relations: M Marchington, McGraw Hill.
3. Report of the National Commission on Labour : Govt. of India.

**COURSEOUTCOMES**

| CO | Details/Statement | ActionVerb | KnowledgeLevel |
|---|---|---|---|
| **CO1** | Understand the fundamental concepts, stakeholders, and legal frameworks of industrial relations in India. | Define, Outline, Illustrate | Understand |
| **CO2** | Analyze the causes and resolution mechanisms of industrial disputes, and evaluate the effectiveness of collective bargaining and workers' participation practices. | Examine, Differentiate, Explain | Apply |
| **CO3** | Formulate strategic approaches to manage industrial relations challenges in the context of modernization, automation, and evolving labour dynamics. | Assess, Evaluate, Formulate | Create |

6. **Mapping of course outcomes to module/course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 1 | - | - |
| 2 | 1 | - | - |

| 3 | 1 | - | - |
|---|---|---|---|
| 4 | - | 2 | - |
| 5 | - | 2 | - |
| 6 | - | 2 | - |
| 7 | - | 2 | - |
| 8 | - | 2 | - |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

7. **Mapping of the Course outcomes to Program Outcomes**

|  | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 | 1 | 1 | 2 | 1 | 3 |
| CO2 | 3 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

**Course Name: Human Resource Information Systems & HR Analytics**

**Course Code: HR-405**

**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]
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1. **Course Prerequisite:**

   - Sound understanding of basic **statistical techniques** (classical inference).

   - Basic familiarity with stochastic modelling (regressions, factor analysis)

2. **Course Learning Objectives:**
   After completion of the course, the students will be able to:

   - **Explain** the components, functions, and implementation considerations of Human Resource Information Systems (HRIS), including cloud-based platforms and legal-ethical frameworks.

   - **Analyze** the role of HR analytics and emerging technologies such as AI and machine learning in workforce planning, performance evaluation, and strategic decision-making.

   - **Design** an integrated HRIS and analytics strategy by aligning systems and data practices with business objectives, ensuring interoperability, compliance, and actionable insights.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve the stated objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks
     **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Name: HR Information Systems & HR Analytics**
   **Course Code: HR 405**
   **Hours per Week:** 4L
   **Credits:** 4

| **Module I** |
| --- |

| 1 | Introduction to HR Information Systems HRIS definition, architecture, functions; benefits and challenges; data security and compliance | 4 |
| --- | --- | --- |

| 2 | HRIS Implementation and Change Management System selection, stakeholder involvement, implementation roadmap; user training; managing change | 4 |
|---|---|---|
| 3 | Cloud-based HR Platforms and SaaS/SaaP Models Cloud computing in HR; advantages of SaaS HR tools like Workday, SAP SuccessFactors, Oracle HCM | 4 |
| 4 | Integration of HRIS with Business Systems ERP systems; integration with finance and operations; interoperability challenges | 4 |
| 5 | Legal and Ethical Issues in HRIS Data protection laws (e.g., GDPR, Indian IT Act), employee consent, surveillance ethics, audit trails | 4 |
| **Module II** | | |
| 6 | Fundamentals of HR Analytics Definition and scope; descriptive, predictive, prescriptive analytics; HR metrics and KPIs | 4 |
| 7 | Workforce Planning and Predictive Analytics Forecasting models; attrition prediction; succession planning using analytics | 4 |
| 8 | People Analytics Tools and Dashboards Visualization tools (Power BI, Tableau); real-time dashboards; storytelling with HR data | 4 |
| 9 | AI and Machine Learning in HR Analytics Applications in recruitment, performance management, learning analytics; algorithmic fairness and bias | 4 |
| 10 | Building an HR Analytics Strategy Aligning analytics to business goals; data governance; developing internal capabilities | 4 |

5. **Suggested Readings**:

**Textbooks**
1. Marler, Janet H. & Boudreau, John W. An Evidence-Based Review of HR Analytics, SAGE.
2. Fitz-Enz, Jac. The New HR Analytics: Predicting the Economic Value of Your Company's Human Capital Investments, AMACOM.

**Reference Books**
3. Stone, Raymond J. Human Resource Management, Wiley.
4. Rasmussen, T., & Ulrich, D. Learning from Practice: How HR Analytics Avoids Being a Management Fad, Organizational Dynamics.
5. Guenole, Nigel, Ferrar, Mark & Feinzig, Jonathan. The Power of People: Learn How Successful Organizations Use Workforce Analytics, Pearson FT Press.

6. **Course Outcomes**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Explain** the components, functions, and implementation considerations of Human Resource Information Systems (HRIS), including cloud-based platforms and legal-ethical frameworks. | Comprehend Articulate, Interpret | Understand |

| CO 2 | **Analyze** the role of HR analytics and emerging technologies such as AI and machine learning in workforce planning, performance | Examine, Compare, Contrast | Analyze |
| | evaluation, and strategic decision-making. | | |
| CO 3 | **Design** an integrated HRIS and analytics strategy by aligning systems and data practices with business objectives, ensuring interoperability, compliance, and actionable insights. | Design, Develop, Conceptualize | Create |

7. **Mapping of course outcomes to module/ course content**

| Module | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | 3 | - | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | |
| 8 | - | 3 | |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|-----|------|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

Course Name: Financial Derivatives & Risk Management

Course Code: FM-401

(Semester IV)
Category: Electives
[4 Credits: 40 Hrs]

1. **Course Prerequisites:**

   ● Basic understanding of **financial markets and instruments**

   ● Knowledge of **Financial Management** (risk, return, time value of money)

   ● Familiarity with **financial accounting** and financial statements

   ● Basic **mathematical and quantitative skills**

2. **Course Learning Objectives:**

   ● To analyze the payoff structures and pricing of forwards, futures, options, and swaps.

   ● To evaluate the use of derivatives in hedging, speculation, and arbitrage.

   ● To understand the clearing, settlement, and margin systems in derivative markets

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology**-Lectures and Presentations, Interactive Discussions and Case Studies, Guest Lectures.
   **Evaluation System- Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 (Total: 40 Marks each)

   ● Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   ● Assignment: 10 Marks

   ● Attendance: 5 Marks

   ● End-Semester Exam (60 Marks)-Summative Assessment.

4. **Course Content:**
   Course Name: Financial Derivatives & Risk Management
   Course Code: FM 401
   Hours per Week: 4L Credits: 4

| Sr.No. | Topics | No of Lectures |
|---|---|---|
| 1 | **Introduction to Financial Derivatives:** Introduction of Financial Derivatives -types of derivatives- Trading mechanism and contracts of the Financial Derivatives instruments | 3L |
| 2 | **Clearing, Settlement & Margin Trading:** Clearing houses and processes, Settlement cycles, Margin trading concepts, Risk management in derivative markets | 2L |

| 3 | **Introduction to Forward Contract:** Forward contracts, Limitations of forward contracts markets, pay-offs, Forward Rate Agreement (FRA), and Forward Foreign Exchange Contract – Cost of Carry Model | 4L |
|---|---|---|
| 4 | **Introduction to Futures Contract:** Introduction to futures, Stock Futures, Index futures, Commodity Futures, and Currency Futures, Distinction between futures and forwards contracts. | 4L |
| 5 | **Concept of Margin & Hedging with Futures**-Types of Margin, Concepts of ITM, ATM, OTM, Concept of Lot size -Open Interest- Hedging through Forward and Futures, Contango and Backwardation, Basis Risk | 4L |
| 6 | **Option:** Call and Put Option, American and European Option, Put-Call Parity | 4L |
| 7 | **Different Option Strategies**: Spreads (Bull Spreads, Bear Spreads and Butterfly Spreads), Combination strategies (Straddles, Strangles, Strips and Straps), Profit & Loss Chart | 5L |
| 8 | **Option Valuation:** Pricing and Valuation of Option Contract-Binomial Option Pricing Model, Black Scholes Model, their interpretations, and assumptions | 6L |
| 9 | **Option Greeks and Risk Metrics:** Delta, Gamma, Vega, Theta, Implications for hedging and trading strategies | 4L |
| 10 | **SWAP Markets:** Concept, Evaluation and Features of Swap, Types of Financial Swaps <br> – Interest Rate Swaps – Currency Swap – Debt-Equity Swap, Pricing of swaps, Real-world applications and strategies | 4L |

# 5. Suggested Readings:

1. Options, Futures and other Derivatives, John C. Hull, Pearson Education
2. Derivatives, Dubofsky and Miller, Oxford University Press
3. Financial Derivatives, Gupta, S.L., Prentice Hall.
4. Financial Derivatives and Risk Management, O.P. Agarwal, Himalaya Publishing
5. Derivatives &Risk Management, Rajiv Srivastava, Oxford Publication House
6. Financial Derivatives: Risk Management, Bhalla. V.K., S. Chand &Company.

## 6. Course Outcomes:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO1 | **Ability to explain** the key concepts, types, and market mechanisms of financial derivatives. | Explain | Understand |
| CO2 | **Ability to analyze** the use of derivatives through payoff diagrams, option strategies, and hedging techniques. | Illustrate | Analyze |
| CO3 | **Ability to solve** problems related to pricing and valuation of forwards, futures, options, and swaps using appropriate models and formulas. | Solve | Create |

## 7. Mapping of course outcomes to module /course content/topic

| Sr. No. | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | | |
| 2 | 1 | | |

| | | | |
|---|---|---|---|
| 3 | | 2 | 3 |
| 4 | 1 | 2 | 2 |
| 5 | | 1 | 2 |
| 6 | 1 | 3 | 2 |
| 7 | | 3 | |
| 8 | | | 3 |
| 9 | | | 2 |
| 10 | 1 | 2 | 3 |

8. **Mapping of the Course out comes to Program Outcomes**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 2 | 1 | 1 | 2 | 1 |
| **CO2** | 3 | 3 | 2 | 1 | 1 | 1 | 2 |
| **CO3** | 3 | 3 | 3 | 2 | 2 | 3 | 3 |

**Course Name: International Finance**
**Course Code: FM-402**

**(Semester IV)**
**Category:Electives**
**[4 Credits: 40 Hrs]**

……………………………………………………………………………………………………

1. **Course Prerequisite:**
   **Basic** prior knowledge of international business operations and the global economy, as the course will focus on cross-border financial issues. A basic understanding of macroeconomic concepts like inflation, interest rates, exchange rates, and international trade policies.

2. **Course Learning Objectives:** After completion of this course, the learners will be able to
   i.   Recognize the role of multinational corporations (MNCs) and their impact on global markets.
   ii.  Develop a deep understanding of how international financial markets operate, including the functions of foreign exchange markets, international capital markets, and trade finance
   iii. Understand how currency risk affects international businesses and how to manage such risks through hedging techniques.
   iv.  Understand different exchange rate determination theories.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology**–Lectures and Presentations, Interactive Discussions and Case Studies, Guest Lectures.
   **Evaluation System– Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**
   ● Class Test    : 25 Marks (Duration: 1 hour)
   ● Assignment: 10 Marks
   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-**Summative Assessment.

4. **Course Content:**
   **Course Name: International Finance**
   **Course Code:** FM 402
   **Hours per Week:** 4L **Credits:** 4

| Sr.No. | Topics | Lec. |
|---|---|---|
| 1 | **International Financial Management:** Domestic Financial Management & International Financial Management. The Emergence of the MNC, Nature of the MNC | **2L** |
| 2 | **International Monetary System:** History of International Monetary System, Bretton Wood System, Present Day Currency Regimes ,Birth of EMU and EURO, Role of IMF,IBRD,WTO | **4L** |
| 3 | **International Flow of Funds:** Balance of payments- Meaning- Components- Principles for recording- significance and limitations- Recent trends in Indian balance of payment- Capital Account Convertibility. | **4L** |

| 4 | **Exchange Rate Determination:** International Parity Conditions–Purchasing Power Parity-Interest rate Parity, Fishers International Parity Theory | 5L |
| 5 | **International Trade Procedure:** Process of Export and Import-necessary documentation-LC, Bank Guarantee, Letter of Intent etc. | 4L |
| 6 | **The Foreign Exchange Market:**–Functions, Participants and Transactions–Exchange Rates and Quotations–Bid & Ask rate– Cross rate-Indian foreign Exchange Market. | 5L |
| 7 | **Foreign Currency Derivatives:–** Forward Foreign Exchange Contract, Futures, Forwards, Swaps– Currency Swap and Interest rate Swap, Quality Spread Differential-Concept of Netting | 6L |
| 8 | **Foreign Exchange Exposure& Risk Management:** Two dimensions of Foreign Exchange Risk-Transactions Exposure & Translation Exposure, Arbitrage opportunity through Money Market Operation | 4L |
| 9 | **International Financial Markets:** International Capital Market – Instruments Traded, International Money Market and Instruments Traded, International Equity Sources- Global Equity Markets- ADR, GDR | 4L |
| 10 | **Foreign Direct Investment and Motives:** FDI and motives of FDI- Firm specific advantages , Internationalization advantages, Country specific advantages | 2L |

## 5. Suggested Readings:

1. Apte,P.G.: International Financial Management,Tata Mc Graw Hill.

2. Eiteman, Stone hill& Pandey: Multinational Business Finance, Pearson Education

3. Eun& Resnick: International Financial management, Tata McGraw-Hill Jeff Madura: International Corporate Finance, Cenage Learning

4. O'Brien:International Finance,OUP

5. A.V.Rajwade ,H.G. Desai, Foreign Exchange– International Finance Risk Management; SPD

6. C. Jeevanandam,Foreign Exchange and Risk management; S.Chand

7. Financial Managers, Kogan Page. 3. Geert Bekaert, Robert Hodrick, 2017, International Financial Management, 3rd Edition, Cambridge University Press.

8. Hanouna, P., Shapiro, A. C, 2020, Multinational Financial Management, 12th Ed., United Kingdom: Wiley.

### 6. Course Outcomes:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO 1 | Gain a comprehensive understanding of the global financial system, including international financial markets, foreign exchange markets, and international financial institutions (IMF, World Bank). | Remember, Understand | Understand |

| CO 2 | Develop the skills to assess macroeconomic risks (political risk, currency fluctuations, and economic downturns) and their effects on business decisions in different countries. | Apply | Apply |
|---|---|---|---|
| CO 3 | Learn how to manage currency risk in international business transactions, and how companies use various financial instruments (e.g., forwards, futures, and, swaps) to hedge against these risks. | Prepare, Analysis, Apply | Apply |

**7. Mapping of course out comes to module/course content/topic**

| Sr.No. | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 1 | - | - |
| 2 | 2 | - | - |
| 3 | 2 | - | - |
| 4 | - | 3 | - |
| 5 | - | 2 | - |
| 6 | - | 3 | - |
| 7 | - | - | 2 |
| 8 | - | - | 3 |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

**8. Mapping of the Course out comes to Program Outcomes**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 1 | 2 | 2 | 1 | 2 | 1 | 3 |
| CO2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |

**(Semester IV)**
**Category: Electives**
**[4 Credits: 40 Hrs]**
……………………………………………………………………………………………………

1. **Course Prerequisite:** A foundational understanding of corporate finance, including financial statements, valuation methods (like discounted cash flows), and basic financial modeling. Basic understanding of statistics, financial ratios, and other tools used in financial analysis.
.

2. **Course Learning Objectives:** After completion of this course, the learners will be able to
   i. Understand the strategic, financial, and operational considerations involved in M&A decisions
   ii. Ability to assess why companies pursue M&A, and the various strategies they adopt (e.g., horizontal, vertical, or conglomerate acquisitions).
   iii. Proficiency in determining the fair value of target companies and understanding the impact of these transactions on shareholder value.
   iv. Identify key legal and regulatory hurdles that companies must navigate during M&A processes.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology–**Lectures and Audio-video Presentations, Interactive Discussions.

   **Evaluation System– Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**
   ● Class Test : 25 Marks (Duration: 1 hour)
   ● Assignment: 10 Marks
   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-**Summative Assessment.

4. **Course Content:**
   **Course Name: Mergers, Acquisition & Corporate Restructuring**
   **Course Code:** FM 403
   **Hours per Week:** 4L **Credits:** 4

| Sr.No. | Topics | Lec. |
|---|---|---|
| 1 | **Introduction to mergers and acquisitions:** Meaning, types, advantages & Dis-advantages. | 3L |
| 2 | **Strategizing and structuring M & A activities:** Merger process from planning to implementation, five stage model, and methods of financing mergers. | 3L |
| 3 | **Synergy and value creation in mergers:** Types of synergy, value creation in synergy | 3L |
| 4 | **Corporate Restructuring:** Meaning & need, different methods of corporate Restructuring. Determination of Exchange Ratio, | 4L |

| 5 | Demergers: Meaning & characteristics, structure of demerger, tax implications | 4L |
|---|---|---|
| 6 | **LBOs, MBOs, MLPs, ESOPs:** Concepts, mode of purchase in LBO, key motives behind an MBO, classify types of MLP, & ESOP. | 4L |
| 7 | **Joint ventures:** Meaning & characteristics, role of joint venture in business strategy, Tax aspect of joint venture, reasons for failure in joint venture. | 4L |
| 8 | **Valuation Models:** Net Asset-Based Approach, Earnings Based Approach (Earnings-Capitalisation Method, P/E Ratio), Relative Valuation, DCF Approach of Two stage model, Equity DCF Model: Dividend Discount Model, Free Cash Flow to Equity(FCFE) Model, Economic Value-Added Method | 8L |
| 9 | **Legal & regulatory framework of M& A:** Provisions of the Companies Act 1956relating to M & A., buy back of shares, provisions for SEBI act 1992, income tax act for M & A. | 5L |
| 10 | Case Studies | 2L |

5. **Suggested Readings**:

1. Kamal Ghosh Roy (2010).Merger & Acquisitions. PHI
2. Rabi Narayan Kar & Minakshi(2017).Mergers Acquisitions& Corporate Restructuring. Taxmann
3. Kapil & Kapil Mergers and Acquisitions: Valuation Leveraged Buyouts and Financing. Willey
4. Donald M. De Pamphilis ,Mergers, Acquisitions, and Other Restructuring Activities, Academic Press
5. RobertF.Bruner,AppliedMergersandAcquisitions,UniversityEdition,Wiley
6. Jean Tirole, The Theory of Corporate Finance, Princeton UniversityPress.
7. Chandra, P., Corporate Valuation, McGraw Hill
8. Kishore, R. M., Corporate Valuation: Text and Cases, Taxmann Publications
9. Damodaran, A., Investment Valuation, Wiley
10. Damodaran, A., Damodaran on Valuation, Wiley

6. **Course Outcomes:**

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | Able to articulate the strategic reasons for mergers and acquisitions, including market expansion, economies of scale, diversification, and acquiring new technologies or talent. | Understand, Recognize | Understand |
| **CO 2** | Analyze and Evaluate in applying financial models and valuation methods to assess the value of companies involved in M&A transactions. | Evaluation, Recognize | Apply |

| CO 3 | Gain insights into different forms of corporate restructuring, such as spin-offs, divestitures, carve-outs, leveraged buyouts (LBOs), and recapitalizations. | Apply, Evaluate | Apply |
|---|---|---|---|

## 7. Mapping of course out comes to module/course content/topic

| Sr.No. | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1 | 1 | | |
| 2 | 3 | | |
| 3 | 2 | | |
| 4 | | 3 | |
| 5 | | 2 | |
| 6 | | 2 | |
| 7 | | | 2 |
| 8 | | | 3 |
| 9 | | | 2 |
| 10 | | | 2 |

## 8. Mapping of the Course out comes to Program Outcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | 2 | 3 | 1 | 2 | 3 | 2 | 3 |
| CO2 | 1 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 |

**Course Name: Working Capital Management**

**Course Code: FM-404**

**(Semester IV)**
**Category: Electives**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:** Understanding of financial statements such as the balance sheet, income statement, and cash flow statement. Ability to analyze liquidity, profitability, and solvency ratios, and interpret them to assess a company's financial health.

2. **Course Learning Objectives:** After completion of this course, the learners will be able to
   i. Define and compute working capital, and understand its role in liquidity management and short-term financial health.
   ii. Assess the individual components of working capital and understand their impact on liquidity, profitability, and risk.
   iii. Choose the most appropriate financing sources to support working capital needs, and manage the trade-off between liquidity and profitability.
   iv. Forecast cash flows, manage cash balances, and optimize cash utilization.
   v. Use financial metrics such as the cash conversion cycle, current ratio, and quick ratio to assess working capital efficiency.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology–**Lectures and Presentations, Interactive Discussions and Case Studies.
   **Evaluation System– Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**
   ● Class Test : 25 Marks (Duration: 1 hour)
   ● Assignment: 10 Marks
   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-**Summative Assessment.

4. **Course Content:**
   **Course Name: Working Capital Management**
   **Course Code:** FM 404
   **Hours per Week:** 4L **Credits:**

| Sr.No. | Topics | Lec. |
|---|---|---|
| 1 | **Introduction to Working Capital Management:** Concept & importance of Working capital management, types of working capital, factors affecting working capital requirements. | 3L |
| 2 | **Planning of Working Capital:** Meaning & significance of operating cycle and cash cycle, estimation of working capital requirements, liquidity vs. profitability. | 4L |
| 3 | **Financing of working capital needs:** Commercial banks, Commercial papers, Factoring, Trade credit, Accrued expenses, Deferred income as source for working capital. | 3L |

| 4 | **The Financing Mix:** Approaches to determine an appropriate financing mix, working capital and banking policy (Recommendations of Dahejja Tandon, Chore & Marathe & Kannan committees.) MPBF norms, Managing credit risk, Disbursement and follow up of working capital finance by bank. | 6L |
|---|---|---|
| 5 | **Cash Management:** Aspects of cash management, Motives for holding cash and marketable securities. | 3L |
| 6 | **Determine Optimum cash balance:** Factors determining the optimum cash balance, Models-Baumol, Miller Orr, Stone, Beranek. | 3L |
| 7 | **Cash Planning:** Cash Planning, Cash budget simulation and cash balance uncertainties, hedging vs. interest rate, future &options. Treasury management, Reasons for Cash flow problems. | 5L |
| 8 | **Receivable management:** Introduction, Objectives of trade credit, credit policies. Dimensions of receivable management, collections from receivables, role of factoring in receivables management. | 5L |
| 9 | **Inventory Management:** Introduction, tools & techniques of inventory management. Inventory control models, valuation of inventories, Inventory management and cash flow time line. | 5L |
| 10 | Integration of working capital and capital investment process. Working capital management practices in India. | 3L |

### 5. Suggested Reading:

1. Van Horne James C. and J.M. Wachowicz, Fundamentals of Financial Management, Prentice Hall, 2005.
2. Pandey,I.M.Financialmanagement,VikasPublishing,2013,Tenthedition
3. Brealey, Richard A and Myers Stewart E., Principles of Corporate Finance, McGraw Hill Inc., New Delhi, 1990.
4. Smith,K.V.,ReadingsinShorttermFinancialManagement,WestPublishingCo.,1988.
5. Prindl,A.,CurrencyManagement,JohnWiley,NewYork,1978.
6. Hill, Ned C., and William L. Satoris, Short Term Financial Management – Text & Cases, Macmillan, NewYork, 1992.
7. Kallberg, JarlG.,andKennethL.Parkinson,Corporate Liquidity and Measurement, Richard D.Irwin, Homewood, Illinois, 1993.
8. Vander,Weide James and Steven F.Maier, Managing Corporate Liquidity, JohnWiley, NewYork,1985

### 6. Course Outcomes:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | Able to understand the concept of working capital and its types, determinants influencing working capital requirement. Learn to manage liquidity effectively. | Understand | Understand |

| CO 2 | Able to compute working capital, and analyze the relationship between current assets and liabilities to assess liquidity and financial stability. Evaluate to optimize the cash requirement. | Evaluation, Apply | Apply |
|------|------|------|------|
| CO 3 | Develop the skill to analyze the key components of working capital (receivables, inventory, payables, and cash) and their impact on a company's operational efficiency; learn the various sources of financing working capital. | Apply | Apply |

### 7. Mapping of course out comes to module/course content/topic

| Sr.No. | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1 | 1 | | |
| 2 | 2 | | |
| 3 | 2 | | |
| 4 | | 2 | |
| 5 | | 3 | |
| 6 | | 3 | |
| 7 | | | 3 |
| 8 | | | 2 |
| 9 | | | 3 |
| 10 | | | 2 |

### 8. Mapping of the Course out comes to Program Outcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | 2 | 3 | 1 | 3 | 3 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |
| CO3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |

…………………………………………………………………………………………

1. **Course Prerequisites:**
   □ Basic understanding of Financial Accounting and Financial Management
   □ Familiarity with Capital Budgeting techniques such as NPV and IRR
2. **Course Learning Objectives:**
   □ To understand the structure, sources, and risks associated with project finance
   □ To gain knowledge on the financial feasibility and cost structures of capital-intensive projects
   □ To evaluate investment decisions using tools like NPV, IRR, DSCR, and sensitivity analysis
3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology-**Lectures and Presentations, Interactive Discussions and Case Studies, Guest Lectures.

   **Evaluation System– Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 (Total: 40 Marks each)

   ● Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   ● Assignment: 10 Marks

   ● Attendance: 5 Marks

   ● End-Semester Exam (60 Marks)-Summative Assessment.

4. **Course Content:**
   **Course Name: Project Appraisal and Finance**
   **Course Code:** FM 405
   **Hours per Week:** 4L **Credits:** 4

| Sr.No. | Topics | No of Lectures |
|---|---|---|
| 1 | **Introduction to Project Finance, Overview and Fundamentals-** Concepts, Functions, Types, Advantages and Disadvantages, Parties involved, Perquisites of Project Finance | 2L |
| 2 | **Overview of Project Finance Risks:** Risk types – conceptualization, construction, closure, political, market, supply chain, policy, exchange, environmental, etc. | 4L |
| 3 | **Risk Mitigation Strategies:** Identification, evaluation, and mitigation tools for project risks; Role of contracts and insurance in risk management | 2L |
| 4 | **Sources of Capital:** debt and equity, Prudence in Mix of Long Term and Short-Term Finance, Forms of Long-Term Project Finance, Forms of Short-Term Project Finance, Lease, Role of Non-Banking Finance Companies (NBFC) | 8L |
| 5 | **Project Selection:** Projects Procurement Process, Life-Cycle Costing, Market Analysis, Competencies and Promoter Analysis, Loan Documentation - Infrastructure and Public Private Partnership models | 6L |

| | | | |
|---|---|---|---|
| 6 | **Cost of Project:** Project specifications, Estimating Fixed Capital Investment in Project, Estimating Working Capital investment in the project, Means of Financing, Concepts of Depreciation and Amortization | | 4L |
| 7 | **Project Feasibility Analysis I:** NPV, cash flows vs profits, discount rate, tax shield on interest, and depreciation | | 3L |
| 8 | **Project Feasibility Analysis II:** IRR, MIRR, XIRR, Equity IRR, Economic IRR, Payback, and Discounted Payback Period | | 3L |
| 9 | **Financial Projections-**Projected Profit and Loss Account, Projected Balance Sheet, Projected Funds Flow, Project IRR, Equity IRR | | 4L |
| 10 | **Project Evaluation and Sensitivity Analysis:** Interest Coverage Ratio (ICR), Debt Service Coverage Ratio (DSCR), Long Term Debt Service Coverage Ratio (LDR4, and scenario/sensitivity analysis for project viability | | 4L |

## 5. Suggested Readings

1       Project Financing: Asset-Based Financial Engineering-John D. Finnerty, Wiley and Sons

2       Project Finance in Theory and Practice: Designing, Structuring and
Financing Private and Public Projects, Stefano Gatti- Academic Press

3       Principles of Project Finance-E.R. Yescombe, Academic Press

4       Corporate and Project Finance Modeling: Theory and Practice-Edward
Bodmer, Wiley and Sons

5       Introduction to Project Finance-Andrew Fight Elsevier

6       PPP and Project Finance-Das, Prabuddha, McGraw-Hill Education

### 6. Course Outcomes:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| CO1 | Ability to describe the structure, sources, and risk factors of project finance across different phases. | Explain | Understand |
| CO2 | Ability to develop financial models to assess capital requirements, funding mix, and cost estimations for projects. | Apply | Analyze |
| CO3 | Ability to assess the financial feasibility of a project using tools like IRR, NPV, and sensitivity analysis. | Evaluate | Create |

### 7. Mapping of course outcomes to module /course content/topic

| Sr. No. | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 1 | | |
| 2 | 1 | 2 | |
| 3 | 2 | | |
| 4 | 1 | 3 | |
| 5 | 2 | 3 | |
| 6 | | 3 | |

| | | | | |
|---|---|---|---|---|
| 7 | | | | 2 |
| 8 | | | | 3 |
| 9 | | | 1 | 2 |
| 10 | | | | 3 |

## 8. Mapping of the Course outcomes to Program Outcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | 2 | 1 | 1 | 2 | 1 |
| **CO2** | 2 | 2 | 1 | 1 | 1 | 1 | 2 |
| **CO3** | 3 | 3 | 2 | 2 | 2 | 3 | 2 |

# Course Name: Business Forecasting and Optimization
## Course Code: BA-401
### (Semester IV)
### Category: Elective
**[4 Credits: 40 Hrs]**

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## 1. Course Prerequisite:
- Basic understanding of **management principles** (e.g., organizational behaviour, business environment).
- Familiarity with **functional areas** (marketing, finance, data analytics and operations).
- Prior exposure to **statistical methods for** business decision-making frameworks is recommended

## 2. Course Learning Objectives:
After completion of the course, the students will be able to:
- **Understand** fundamental forecasting methods and their applications in business decision-making.
- **Apply** statistical, econometric, and machine learning models to predict business trends**.**
- **Utilize** optimization techniques to enhance forecasting accuracy and resource allocation.
- **Develop** data-driven strategies for demand forecasting, financial modelling, and risk management.

## 3. Teaching methodology and evaluation system for the course:

**Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.

**Evaluation System – Continuous Internal Assessment (Twice in a semester)**
CIA1 and CIA2 **(Total: 40 Marks each)**
- Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)
- Assignment: 10 Marks
- Attendance: 5 Marks

**End-Semester Exam (60 Marks)-** Summative Assessment.

## 4. Course Content:
**Course Name: Business Forecasting and Optimization**
**Course Code: BA 401**
**Hours per Week:** 4L
**Credits:** 4

| Sl. No. | Topic | No of Lectures |
|---|---|---|
| 1 | **Introduction to Business Forecasting :** Importance of Forecasting in Business Decision-Making, Types of Forecasting: Short-term, Medium-term, Long-term, Qualitative vs. Quantitative Forecasting Methods, Common Challenges in Business Forecasting, Applications of Forecasting in Marketing, Finance, and Supply Chain Management. | **3L** |
| 2 | **Fundamentals of Time Series Analysis :** Understanding Time Series Data: Trends, Seasonality, Cyclic, and Irregular Components, Decomposition of Time Series: Additive vs. Multiplicative Models, Moving Averages and Exponential Smoothing, Stationarity and Differencing, Autocorrelation and Partial Autocorrelation Functions (ACF & PACF) | **3L** |
| 3 | **Regression-Based Forecasting Models :** Simple Linear Regression for Trend Forecasting, Multiple Linear Regression and Its Business Applications, Polynomial and Logarithmic Regression Models, Multicollinearity, Heteroscedasticity, and Autocorrelation Issues, Model Evaluation Metrics: $R^2$, Adjusted $R^2$, RMSEA, MAE | **5L** |

| | | |
|---|---|---|
| 4 | **Time Series Forecasting Models:** Naïve Forecasting Methods, Autoregressive Integrated Moving Average (ARIMA) Models, Seasonal ARIMA (SARIMA) for Seasonal Forecasting, Exponential Smoothing Methods: Holt's & Holt-Winters Models, Case Studies: Demand Forecasting and Revenue Prediction | **5L** |
| 5 | **Econometric Forecasting Models :** Introduction to Econometric Models in Business Forecasting, Vector Auto-regression (VAR) and Vector Error Correction Model (VECM), Granger Causality and Forecasting Economic Indicators, Simultaneous Equation Models in Business Decision Making, Case Studies: Macroeconomic Forecasting and Financial Forecasting | **5L** |
| 6 | **Optimization Techniques in Business Forecasting :** Introduction to Optimization in Business Analytics, Linear and Nonlinear Optimization Models, Integer Programming and Dynamic Optimization, Forecasting with Constrained Resource Optimization<br>Case Studies: Workforce Planning and Inventory Optimization | **4L** |
| 7 | **Forecasting in Business Applications:** Demand Forecasting in Supply Chain and Logistics, Financial Forecasting and Risk Management Models, Workforce and HR Analytics Forecasting, Price Optimization and Revenue Management, Marketing Mix Optimization for Advertisement Budgeting | **4L** |
| 8 | **Model Validation and Performance Evaluation :** Key Performance Metrics: MSE, RMSE, MAPE, AIC, BIC, Cross-Validation Techniques in Forecasting Models, Overfitting and Under-fitting Issues in Predictive Modelling, Bias-Variance Trade-off in Business Forecasting Models, Best Practices for Reliable Forecasting and Business Decision-Making | **4L** |
| 9 | **Machine Learning for Business Forecasting :** Introduction to Supervised Learning for Forecasting, Decision Tree Regressors & Random Forest for Time Series Prediction, Neural Networks and Deep Learning for Forecasting, Gradient Boosting Models: XGBoost, Light GBM, and Cat Boost, Case Studies: Retail Sales Forecasting and Customer Demand Forecasting | **4L** |
| 10 | **Future Trends in Forecasting & Optimization:** Big Data and AI in Business Forecasting, Predictive Analytics with Cloud Computing, Real-Time Forecasting in Business Operations, Scenario Analysis and Simulation for Strategic Planning, Ethical Considerations and Bias in Business Forecasting | **4L** |

5. **Suggested Readings:**

**Text Book (TB)**

1. Business Forecasting, John E. Hanke, Dean W. Wichern, Pearson, 2006
2. Applied Time Series Analysis and Forecasting, Richard Harris, Robert Sollis, Wiley

**Reference Book (RB):**
1. Forecasting: Principles and Practice, Rob J. Hyndman, George Athanasopoulos, OTexts,, 2013
2. Business Analytics: Data Analysis and Decision Making, S. Christian Albright, Wayne L. Winston Cengage Learning, 2014
3. Machine Learning for Time Series Forecasting with Python, Francesca Lazzeri , Wiley, 2021.

### 6. COURSE OUTCOMES

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Understand** fundamental forecasting methods and their applications in business decision-making. | Comprehend Articulate, Interpret | Understand |
| **CO 2** | **Apply** statistical, econometric, and machine learning models to predict business trends. | Demonstrate, Use, Implement | Apply |
| **CO 3** | **Utilize** optimization techniques to enhance forecasting accuracy and resource allocation. | Demonstrate, Use, Implement | Apply |
| **CO 4** | **Develop** data-driven strategies for demand forecasting, financial modelling, and risk management. | Create, Design, Conceptualize | Create |

### 7. Mapping of course outcomes to module / course content

| Module | CO1 | CO2 | CO3 | CO4 |
|---|---|---|---|---|
| 1 | 3 | - | - | |
| 2 | 3 | - | - | |
| 3 | 3 | - | - | |
| 4 | - | 3 | - | |
| 5 | - | 3 | - | |
| 6 | - | 3 | - | |
| 7 | - | - | 3 | |
| 8 | - | - | 3 | 3 |
| 9 | - | - | - | 3 |
| 10 | - | - | - | 3 |

### 8. Mapping of the Course outcomes to Program Outcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |
| CO4 | 3 | 3 | 3 | 1 | 1 | 3 | 3 |

**Course Name: Data Science for Business - II**
**Course Code: BA-402**
**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**

   ● Sound understanding of basic **statistical techniques** (classical inference).

   ● Basic familiarity with **stochastic modelling** (regressions, factor analysis)

2. **Course Learning Objectives:**
   After completion of the course, the students will be able to:

   ● **Explain** the role of Python in business data analytics, including fundamental programming concepts, data handling techniques, and core Python libraries used for analysis and visualization.

   ● **Analyze** datasets using Python by applying techniques such as data cleaning, exploratory data analysis (EDA), descriptive statistics, and predictive modeling to extract meaningful business insights.

   ● **Design** data-driven solutions through project-based applications by integrating data manipulation, statistical methods, and visualization techniques while addressing ethical and privacy considerations in analytics.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve the stated objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   ● Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   ● Assignment: 10 Marks

   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Data Science for Business - II**
   **Course Code: BA 402**
   **Hours per Week:** 4L
   **Credits:** 4

| Module I | |
|---|---|
| 1 **Introduction to Data Analytics and Python** Understanding data analytics in business, need for Python, installing Python with Anaconda/Jupyter, first Python scripts | 4 |

| 2 | **Python Basics for Data Analytics** Data types, variables, control structures, functions, basic I/O, using libraries (numpy, pandas) | 4 |
|---|---|---|
| 3 | **Working with Data in Python** Importing CSV/Excel files, data cleaning, handling missing values, filtering and sorting data | 4 |
| 4 | **Data Manipulation Using Pandas** DataFrames, Series, indexing, slicing, grouping, pivot tables, merging datasets | 4 |
| 5 | **Data Visualization Using Python** Basic plots using matplotlib, advanced plots with Seaborn, interpreting visualizations | 4 |
| **Module 2** | | |
| 6 | **Exploratory Data Analysis (EDA)** Understanding data distribution, detecting outliers, correlation, business insight generation | 4 |
| 7 | **Descriptive and Inferential Statistics** Mean, median, mode, standard deviation, hypothesis testing (t-test, chi-square) using Python | 4 |
| 8 | **Predictive Analytics Using Python** Linear and logistic regression, train/test split, model accuracy and interpretation | 4 |
| 9 | **Business Case Study Applications** Retail, HR, Marketing analytics using real datasets in Python; project-based walkthroughs | 4 |
| 10 | **Ethical Issues, Trends, and Capstone Project** Data privacy, Python for dashboards, automated reports, future of analytics | 4 |

5. **Suggested Readings:**
   **Textbooks:**
   1. Agarwal, R. & Agarwal, A. (2021). *Data Analytics Using Python*. Wiley India.
   2. McKinney, W. (2018). *Python for Data Analysis*, 2nd Edition. O'Reilly Media.
   3. Raschka, S., & Mirjalili, V. (2020). *Python Machine Learning*, 3rd Edition. Packt Publishing.
   **Reference books:**
   4. VanderPlas, J. (2016). *Python Data Science Handbook*. O'Reilly Media.
   5. Bhardwaj, R. K. (2020). *Data Science for Managers*. Sage Publications India.

6. **Course Outcomes**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Explain** the role of Python in business data analytics, including fundamental programming concepts, data handling techniques, and core Python libraries used for analysis and visualization. | Comprehend Articulate, Interpret | Understand |
| **CO 2** | **Analyze** datasets using Python by applying techniques such as data cleaning, exploratory data analysis (EDA), descriptive | Examine, Compare, Contrast | Analyze |

| | | | |
|---|---|---|---|
| | statistics, and predictive modeling to extract meaningful business insights | | |
| CO 3 | **Design** data-driven solutions through project-based applications by integrating data manipulation, statistical methods, and visualization techniques while addressing ethical and privacy considerations in analytics. | Design, Develop, Conceptualize | Create |

7. **Mapping of course outcomes to module/ course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | | 3- | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | |
| 8 | - | 3 | |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

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**Course Name: Macro-Programming for Business**
**Course Code: BA-403**
**(Semester IV)**
**Category: Elective**
[**4 Credits: 40 Hrs**]

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1. **Course Prerequisite:**
   I.   Basic Knowledge of Microsoft Excel - Familiarity with basic spreadsheet operations like cell formatting, simple formulas, and chart creation.
   II.  Fundamental Understanding of Business Operations - Awareness of basic business functions such as sales, finance, marketing, and operations to relate analytics to real-world scenarios.
   III. Basic Computer Literacy and Logical Thinking - Comfort with using computers, file management, and understanding of logical flow structures (like if-else conditions).

2. **Course Learning Objectives:**
   I.   To equip students with advanced spreadsheet skills and introduce macro programming using VBA for business analytics applications.
   II.  To develop the ability to automate business processes, connect to databases and APIs, and perform error-free data management using Excel and VBA.
   III. To enable students to design and implement business analytics models and automate reporting by integrating Excel with other business tools for data-driven decision-making.

3. **Teaching methodology and evaluation system for the course:**
   **A. Teaching methodology –**

   - Lectures and Presentations

   - Interactive Discussion

   - Case Studies

   - Guest Lectures.

   **B. Evaluation System –**

   - Internal Assessment (25 Marks)

   - Assignment (10 Marks)

   - Attendance (5 Marks)

   - Internal Exam (40 Marks)- Summative Assessment [CIA1, CIA2]

   - End-Semester Exam (60 Marks)- Summative Assessment.

4. **Course Outcomes:**

By the end of this course, students will be able to –

- Demonstrate proficiency in advanced spreadsheet functions and macro-programming for business analytics.

- Develop automation solutions using VBA to streamline business processes and decision-making.

- Implement database connectivity, API integration, and file handling within Excel for data-driven applications.
- Design and execute business analytics models using Excel and VBA for real-world business scenarios.

| CO # | Course Outcome (CO) | Action Verbs | Bloom's Level | Key Focus Areas |
|------|---------------------|--------------|---------------|-----------------|
| CO1 | Demonstrate proficiency in advanced spreadsheet functions and macro-programming for business analytics. | Demonstrate, Apply | Apply (Level 3) | Advanced Excel functions, Macro programming, Business analytics tasks |
| CO2 | Develop automation solutions using VBA to streamline business processes and decision-making. | Develop, Automate, Implement | Create (Level 6) | VBA programming, Process automation, Business decision support |
| CO3 | Implement database connectivity, API integration, and file handling within Excel for data-driven applications. | Implement, Integrate | Apply (Level 3) | Database connectivity, API handling, File management in Excel |
| CO4 | Design and execute business analytics models using Excel and VBA for real-world business scenarios. | Design, Execute, Model | Create (Level 6), Apply (Level 3) | Business analytics modeling, Simulation, Real-world case applications |

**5. Course Content:**
**Course Name - Macro-Programming For Business Analytics**
**Course Code – BA403**
**Hours per Week -** 4L:0T:0P
**Credits –** 4

| Sl. No. | Topics/ Section Title & Detailed Contents | No. of Lectures |
|---------|-------------------------------------------|-----------------|
| 1 | Introduction to MS Excel Spreadsheets - Overview of spreadsheet functionalities for business analytics, advanced cell referencing, named ranges, data validation, and conditional formatting. | 3 |
| 2 | Data Cleaning and Pre-processing in Spreadsheets - Handling missing data, duplicate removal, text-to-columns, flash fill, power query, and using simple formulas like TRIM, PROPER, and SUBSTITUTE. Techniques for checking data integrity and building scope for automation. | 3 |
| 3 | Advanced Data Analysis and Visualization - Pivot tables, slicers, charts (scatter, box plots, histograms), conditional formatting with formulas, and dynamic dashboards using form controls and named ranges. | 4 |
| 4 | Fundamentals of Macros and Macro-programming - Introduction to macros, recording macros, understanding the VBA editor, variables, loops, decision structures, and error handling techniques. | 5 |
| 5 | User-defined Functions and Automation in VBA - Creating custom functions (UDFs) in VBA, automation techniques for repetitive tasks, integrating VBA with worksheet functions, and | 6 |

| | | | |
|---|---|---|---|
| | optimizing macro performance. | | |
| 6 | Basics of File Handling, Database Connectivity, and APIs in VBA - Automating file operations (opening, saving, and exporting), connecting Excel to databases (SQL, Access), fetching data from web APIs using VBA. | 6 |
| 7 | Advanced Error Handling and Debugging in VBA - Debugging tools, breakpoints, watch window, structured error handling using 'On Error' statements, logging mechanisms, and best practices in macro security. | 6 |
| 8 | Business Analytics Models Using Excel & VBA - Implementing regression, forecasting, optimization, decision trees, and Monte Carlo simulation using Excel formulas, Solver, and VBA scripts. | 3 |
| 9 | Integration of Excel with Other Business Tools – Basic ideas of automating reporting with PowerPoint and Word using VBA, interaction with Outlook for email automation, and leveraging Power BI integration for analytics. | 3 |
| 10 | Case Studies - Industry use cases and brief case studies, quiz and presentations. | 1 |

## 6. Suggested Readings:

- Gupta, U. (2021). *Business Analytics with Excel and Power BI* (1st ed.). BPB Publications.

- Walkenbach, J. (2019). *Excel 2019 Power Programming with VBA* (1st ed.). Wiley.

- Winston, W. L. (2016). *Microsoft Excel 2016 Data Analysis and Business Modeling* (5th ed.). Microsoft Press.

- Bullen, S., Bovey, J., & Green, R. (2015). *Professional Excel Development: The Definitive Guide to Developing Applications Using Microsoft Excel, VBA, and .NET* (2nd ed.). Addison-Wesley.

- Alexander, M., & Kusleika, D. (2022). *Excel VBA Programming for Dummies* (6th ed.). Wiley.

## 7. Mapping of course outcomes to module / course content

| Module | Module Title | CO1 | CO2 | CO3 | CO4 | Key Focus Areas |
|---|---|---|---|---|---|---|
| 1 | Intro to Excel for Business Analytics | 3 | 1 | 1 | 1 | Core spreadsheet skills |
| 2 | Data Cleaning & Pre-processing | 3 | 2 | 1 | 2 | Data prep for automation |
| 3 | Advanced Analysis & Visualization | 3 | 1 | 1 | 2 | Pivots, dashboards |
| 4 | Macro Programming Fundamentals | 1 | 3 | 1 | 1 | VBA basics |
| 5 | User-Defined Functions & Automation | 2 | 3 | 2 | 2 | Custom VBA solutions |
| 6 | File Handling & DB Connectivity | 1 | 2 | 3 | 2 | API/SQL integration |
| 7 | Advanced Error Handling | 1 | 3 | 2 | 1 | Debugging, security |
| 8 | Business Analytics Models | 2 | 2 | 2 | 3 | Regression, simulation |
| 9 | Integration with Other Tools | 1 | 3 | 3 | 2 | PowerPoint/Outlook automation |
| 10 | Case Studies | 2 | 2 | 2 | 3 | Real-world applications |

## 8. Program Outcomes (POs):

1. Graduates of the MBA program are expected to demonstrate competence in basic level of commerce, social and information sciences, fundamental quantitative methods and specialized functional domains of management appropriate to the program.
2. Graduates of the program are expected to be able to use appropriate knowledge and skills to identify, formulate, investigate, analyze and solve complex business problems in order to reach substantiated conclusions.
3. Graduates of the program are expected to be able to design solutions for complex multi-dimensional corporate problems and execute systems, components or processes that meet specified needs using contemporary techniques, resources, and management tools with appropriate attention to applicable standards and relevant strategic framework.
4. Graduates of the program are expected to work effectively as a member and leader in teams preferably in a multi-disciplinary setting.
5. Graduates of the program are expected to communicate effectively with all the stakeholders as a part of his role as a manager
6. Graduates of the program are expected to apply ethical principles and make ethical choices for the larger interest of Enterprise, Public and Society.
7. Graduates of the program are expected to engage in independent and life-long learning to evolve as responsible Corporate Leaders.

## 9. Mapping of the Course outcomes to Program Outcomes

| PO # | Program Outcome (PO) | CO 1 | CO 2 | CO 3 | CO 4 | Justification |
|------|----------------------|------|------|------|------|---------------|
| PO 1 | Competence in commerce, social & information sciences, quantitative methods, and management functions. | 3 | 3 | 3 | 3 | All COs contribute significantly by building technical and analytical skills required for modern business problem-solving and management decision support. |
| PO 2 | Identify, formulate, investigate, analyze, and solve complex business problems. | 2 | 3 | 3 | 3 | CO2–CO4 directly enhance problem-solving skills through automation, integration, and analytics modeling; CO1 provides foundational tools to support this. |
| PO 3 | Design solutions and execute systems or processes using contemporary tools and strategic frameworks. | 2 | 3 | 3 | 3 | CO2–CO4 are aligned with system design and implementation of analytics solutions; CO1 provides the groundwork for tool proficiency. |
| PO 4 | Work effectively as a member or leader in multi-disciplinary teams. | 1 | 2 | 2 | 2 | CO2–CO4 encourage collaboration in real-world scenario modeling and solution development; CO1 has minimal contribution. |
| PO 5 | Communicate effectively with stakeholders. | 1 | 2 | 2 | 3 | CO4 enhances communication through model presentation and business interpretation; CO2–CO3 support it indirectly; CO1 has limited impact. |
| PO 6 | Apply ethical principles and make ethical choices for | 1 | 2 | 2 | 2 | CO2–CO4 encourage responsible decision-making through data |

| | | | | | | |
|---|---|---|---|---|---|---|
| | enterprise, public, and society. | | | | | integrity, process automation, and real-world applications. |
| PO 7 | Engage in independent and life-long learning as corporate leaders. | 2 | 3 | 3 | 3 | All COs promote continuous learning, especially in adopting new technologies and analytics tools relevant for evolving managerial practices. |

**Course Name: Advanced AI in Business**
**Course Code: BA-404**
**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**

   - Basic understanding of **management principles** (e.g., organizational behaviour, business environment).

   - Familiarity with **functional areas** (marketing, finance, data analytics and operations).

   - Prior exposure to **basics of Artificial Intelligence** frameworks is recommended

2. **Course Learning Objectives:**
   After completion of the course, the students will be able to:

   - **Analyze and apply** AI techniques for data-driven decision-making across various business functions.

   - **Implement** machine learning, NLP, and deep learning models for solving real-world business challenges.

   - **Evaluate** the impact of AI-driven automation on business processes and operational efficiency.

   - **Assess** ethical considerations, biases, and regulatory frameworks in AI applications for responsible AI adoption.

3. **Teaching methodology and evaluation system for the course:**

   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

     **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name: Advanced AI in Business**
   **Course Code: BA 404**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topics/ Section Title & Detailed Contents | No. of Lectures |
|---|---|---|
| 1 | Introduction to AI in Business - Overview of AI applications in business, history and evolution of AI, AI vs. traditional analytics, ethical considerations, and key AI-driven business transformations. | 3 |
| 2 | Machine Learning for Business Decision-Making - Supervised and unsupervised learning, key ML algorithms (regression, decision trees, clustering), model evaluation metrics, and real-world business applications in marketing, finance, and operations. | 5 |

| 3 | Natural Language Processing (NLP) in Business - Fundamentals of NLP, sentiment analysis, chatbots, text mining, AI-powered customer support, and NLP applications in competitive intelligence. | 4 |
|---|---|---|
| 4 | AI for Forecasting and Predictive Analytics - Time series forecasting, demand prediction, AI-driven financial forecasting, anomaly detection, and optimization in business planning. Hands-on demonstration using AI tools. | 4 |
| 5 | Deep Learning and Neural Networks in Business - Introduction to deep learning, neural networks, convolutional neural networks (CNNs), applications in image recognition, fraud detection, and recommendation systems. | 4 |
| 6 | AI in Marketing and Consumer Insights - Personalization using AI, recommendation systems (e.g., Netflix, Amazon), customer segmentation with AI, AI-driven sentiment analysis, and behavioural prediction in e-commerce. | 3 |
| 7 | AI in Operations and Supply Chain Management - AI in logistics optimization, demand-supply matching, predictive maintenance, AI-powered procurement, and warehouse automation. | 4 |
| 8 | AI and Business Process Automation (RPA & AI) - Introduction to Robotic Process Automation (RPA), AI-powered automation in HR, finance, and customer service, intelligent document processing, and case studies on business efficiency improvements. | 5 |
| 9 | Ethics, Bias, and Responsible AI in Business - Understanding AI biases, fairness in AI models, ethical AI frameworks, regulatory considerations, and corporate responsibility in AI adoption. | 4 |
| 10 | Industry Use Cases and Case Studies – References to real-world AI projects across industries, outlines of implementation of AI models using business datasets, AI adoption challenges, quiz and presentations. | 4 |

5. **Suggested Readings:**

**Text Book (TB)**

1. Chopra, A. (2020). Artificial Intelligence for Business: A Roadmap for Getting Started with AI. Addison-Wesley.
2. Russell, S., & Norvig, P. (2021). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.

**Reference Book (RB):**

3. Géron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow (2nd ed.). O'Reilly Media.
4. Provost, F., & Fawcett, T. (2013). Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking. O'Reilly Media.
5. Davenport, T., & Ronanki, R. (2018). The AI Advantage: How to Put the Artificial Intelligence Revolution to Work. MIT Press.

6. **COURSE OUTCOMES**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Analyze and apply** AI techniques for data-driven decision-making across various business functions. | Examine, Compare, Contrast | Analyze |
| **CO 2** | **Implement** machine learning, NLP, and deep learning models for solving real-world business challenges. | Demonstrate, Use, Implement | Apply |

| | | | |
|------|---|---|---|
| **CO 3** | **Evaluate** the impact of AI-driven automation on business processes and operational efficiency. | Assess, Critique, Recommend | Evaluate |
| **CO 4** | **Assess** ethical considerations, biases, and regulatory frameworks in AI applications for responsible AI adoption. | Assess, Critique, Recommend | Evaluate |

7. **Mapping of course outcomes to module / course content**

| Module | CO1 | CO2 | CO3 | CO4 |
|--------|-----|-----|-----|-----|
| 1 | 3 | - | - | - |
| 2 | - | 3 | - | - |
| 3 | - | 3 | - | - |
| 4 | - | 3 | - | - |
| 5 | - | 3 | - | - |
| 6 | - | 3 | - | - |
| 7 | - | - | 3 | - |
| 8 | - | - | 3 | - |
| 9 | - | - | - | 3 |
| 10 | - | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|------|------|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |
| CO4 | 3 | 3 | 3 | 1 | 1 | 3 | 3 |

## Course Name: Ethics & Data Privacy in Analytics
### Course Code: BA-405
### (Semester III)
### Category: Elective
#### [4 Credits: 40 Hrs]

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1. **Course Prerequisite:**

   - Sound understanding of basic data analytics.

   - Basic familiarity with R, Python and the principles of data science.

   - Learned empathy for the application of technologies in businesses.

2. **Course Learning Objectives:**

   After completion of the course, the students will be able to:

   **Explain** key ethical principles, regulatory frameworks, and stakeholder responsibilities involved in data analytics and AI-driven decision-making.

   **Analyze** real-world challenges related to bias, fairness, transparency, and data privacy in the design and deployment of algorithms and emerging technologies.

   **Design** organizational frameworks and governance strategies that promote ethical data practices, legal compliance, and responsible innovation in analytics and artificial intelligence.

3. **Teaching methodology and evaluation system for the course:**

   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve the stated objectives.

   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**

   CIA1 and CIA2 **(Total: 40 Marks each)**

   - Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   - Assignment: 10 Marks

   - Attendance: 5 Marks

     **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Name: Ethics & Data Privacy in Analytics**
   **Course Code: BA 405**
   **Hours per Week:** 4L
   **Credits:** 4

| Module I | | |
|---|---|---|
| 1 | Introduction to Ethics in Data Analytics Ethical principles; stakeholders and responsibilities; role of ethics in data-driven decision-making | 4 |
| 2 | Bias and Fairness in Algorithms Sources of bias; algorithmic discrimination; fairness frameworks; mitigating bias in machine learning | 4 |

| 3 | Transparency and Accountability in AI Explainability; black-box models vs. interpretable models; ethical AI practices and audits | 4 |
|---|---|---|
| 4 | Data Ownership and Consent Understanding data subjects and owners; informed consent in data collection; ethical data sharing practices | 4 |
| 5 | Ethical Governance and Organizational Culture Developing ethical guidelines; role of leadership; training and internal audits; ethical dilemmas | 4 |
| **Module II** | | |
| 6 | Fundamentals of Data Privacy - Privacy definitions and types; importance in analytics; principles of data minimization and purpose limitation | 4 |
| 7 | Regulatory Frameworks (India and Global)Indian DPDP Act 2023; GDPR (EU); HIPAA (US); sector-specific norms; rights of data subjects | 4 |
| 8 | Data Security and Risk Management Threats and vulnerabilities; encryption, anonymization, and pseudonymization; breach response strategies | 4 |
| 9 | Cross-border Data Flows and International Compliance Jurisdictional issues; adequacy decisions; data transfer agreements; global privacy standards | 4 |
| 10 | Legal and Ethical Challenges in Emerging Tech AI ethics; facial recognition; surveillance technologies; predictive policing; legal precedents and debates | 4 |

### 5. Suggested Readings:

**Textbooks**
1. O'Neil, Cathy. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy, Crown Publishing.
2. Richards, Neil M. & King, Jonathan H. Big Data Ethics, Wake Forest Law Review.
3. Solove, Daniel J. Understanding Privacy, Harvard University Press.

**Reference Books**
4. Mayer-Schönberger, Viktor & Cukier, Kenneth. Big Data: A Revolution That Will Transform How We Live, Work, and Think, Eamon Dolan.
5. Kuner, Christopher. Transborder Data Flows and Data Privacy Law, Oxford University Press.

### 6. Course Outcomes

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Explain** key ethical principles, regulatory frameworks, and stakeholder responsibilities involved in data analytics and AI-driven decision-making | Comprehend Articulate, Interpret | Understand |
| **CO 2** | **Analyze** real-world challenges related to bias, fairness, transparency, and data privacy in the design and deployment of algorithms and emerging technologies. | Examine, Compare, Contrast | Analyze |
| **CO 3** | **Design** organizational frameworks and | Design, | Create |

| | | | |
|---|---|---|---|
| | governance strategies that promote ethical data practices, legal compliance, and responsible innovation in analytics and artificial intelligence. | Develop, Conceptualize | |

**7. Mapping of course outcomes to module/ course content**

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | 3 | - | - |
| 4 | 3- | | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | |
| 8 | - | 3 | |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

**8. Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

**Course Name: Business Intelligence And Big Data**
**Course Code: SM-401**
**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]

1. **Course Prerequisite:**
    I.    Basic Knowledge of Databases and SQL - Understanding of relational databases, SQL queries, and basic data management concepts.
    II.   Fundamental Understanding of Statistics and Analytics - Knowledge of descriptive statistics, data analysis techniques, and visualization basics.
    III.  Basic Computer Programming Skills - Familiarity with any programming language (preferably Python or R) for data handling and basic scripting.

2. **Course Learning Objectives:**
    I.    To understand the core concepts, tools, and technologies of Business Intelligence and Big Data Analytics.
    II.   To develop practical skills in handling large datasets, creating dashboards, and using data mining techniques for predictive and prescriptive analytics.
    III.  To apply Big Data platforms and BI tools in solving real-world business problems while ensuring ethical considerations and data governance.

3. **Teaching methodology and evaluation system for the course:**
    A. **Teaching methodology –**

    ● Lectures and Presentations

    ● Interactive Discussion

    ● Case Studies

    ● Guest Lectures.

    B. **Evaluation System –**

    ● Internal Assessment (25 Marks)

    ● Assignment (10 Marks)

    ● Attendance (5 Marks)

    ● Internal Exam (40 Marks)- Summative Assessment [CIA1, CIA2]

    ● End-Semester Exam (60 Marks)- Summative Assessment.

4. **Course Outcomes:**

By the end of this course, students will be able to –

● CO1: Demonstrate proficiency in using Business Intelligence tools and data visualization techniques to create interactive dashboards and reports for business decision-making.

● CO2: Apply data mining and predictive analytics methods to extract insights from large and complex datasets.

● CO3: Integrate Big Data technologies such as Hadoop, Spark, and NoSQL databases to handle large-scale data storage, processing, and analytics tasks.

● CO4: Analyze and address ethical, privacy, and security issues in Business Intelligence and Big Data systems while implementing real-world solutions.

| CO# | Course Outcome (CO) | Action Verbs | Bloom's Level | Key Focus Areas |
|---|---|---|---|---|
| CO1 | Demonstrate proficiency in using Business Intelligence tools and data visualization techniques to create interactive dashboards and reports for business decision-making. | Demonstrate, Create, Visualize | Apply (Level 3), Create (Level 6) | BI Tools, Dashboard Design, Data Visualization, Business Reporting |
| CO2 | Apply data mining and predictive analytics methods to extract insights from large and complex datasets. | Apply, Analyze, Extract | Apply (Level 3), Analyze (Level 4) | Data Mining, Predictive Analytics, Business Insights |
| CO3 | Integrate Big Data technologies such as Hadoop, Spark, and NoSQL databases to handle large-scale data storage, processing, and analytics tasks. | Integrate, Implement, Handle | Apply (Level 3), Create (Level 6) | Big Data Ecosystem, Distributed Computing, Data Storage & Processing |
| CO4 | Analyze and address ethical, privacy, and security issues in Business Intelligence and Big Data systems while implementing real-world solutions. | Analyze, Address, Implement | Analyze (Level 4), Evaluate (Level 5) | Data Ethics, Security, Privacy, Compliance in Analytics |

5. **Course Content:**
   **Course Name -Business Intelligence And Big Data**
   **Course Code - SM401**
   **Hours per Week -** 4L:0T:0P
   **Credits -** 4

| l. No. | Module Title & Detailed Contents | No. of Lectures |
|---|---|---|
| 1 | **Introduction to Business Intelligence (BI) and Big Data**<br>Definition, scope, and importance of BI and Big Data. Differences between BI and traditional analytics. Current trends and industry use cases. | 4 |
| 2 | **Data Warehousing and Data Marts**<br>Concept of data warehousing, ETL processes, OLAP vs OLTP systems, data marts, star and snowflake schemas, metadata management. | 4 |
| 3 | **Data Mining and Predictive Analytics**<br>Overview of data mining, association rules, clustering, classification, regression techniques, and practical business applications. | 4 |
| 4 | **Big Data Fundamentals**<br>Characteristics of Big Data (5 Vs: Volume, Velocity, Variety, Veracity, Value), Hadoop ecosystem, HDFS, MapReduce, and Introduction to NoSQL databases. | 4 |
| 5 | **Business Intelligence Tools and Dashboards**<br>BI lifecycle, introduction to tools like Power BI, Tableau, QlikView, dashboard design principles, and KPI measurement. | 4 |
| 6 | **Big Data Analytics Platforms**<br>Working with platforms such as Apache Spark, Hive, Pig, and basics of cloud-based Big Data services (AWS, Azure, Google BigQuery). | 4 |
| 7 | **Data Visualization Techniques**<br>Principles of data visualization, storytelling with data, interactive dashboards, and use of charts, graphs, and heatmaps for business insights. | 3 |
| 8 | **Text Analytics and Social Media Analytics**<br>Natural Language Processing basics, sentiment analysis, mining unstructured data from social media platforms, and brand monitoring. | 3 |
| 9 | **Big Data Security, Ethics, and Governance**<br>Data privacy, cybersecurity issues in Big Data, legal and ethical considerations, data governance frameworks. | 3 |
| 10 | **Case Studies, Applications, and Future Trends** | 3 |

| | Real-life business case studies from finance, healthcare, retail, etc. Emerging trends like AI in BI, real-time analytics, IoT data handling, and quantum data. | |
|---|---|---|

## 6. Suggested Readings:

- Data Science for Business by Foster Provost and Tom Fawcett
- Big Data: A Revolution That Will Transform How We Live, Work, and Think y Viktor Mayer- Schönberger and Kenneth Cukier
- The Data Warehouse Toolkit by Ralph Kimball and Margy Ross

## 7. Mapping of course outcomes to module / course content

| Module # | Module Title | CO1 | CO2 | CO3 | CO4 | Key Focus Areas |
|---|---|---|---|---|---|---|
| 1 | Introduction to BI and Big Data | 2 | 2 | 2 | 1 | BI & Big Data fundamentals, business applications |
| 2 | Data Warehousing and Data Marts | 3 | 2 | 2 | 1 | ETL, data storage, schema design |
| 3 | Data Mining and Predictive Analytics | 1 | 3 | 1 | 1 | Clustering, classification, regression, pattern discovery |
| 4 | Big Data Fundamentals | 1 | 2 | 3 | 1 | Hadoop, HDFS, MapReduce, NoSQL |
| 5 | BI Tools and Dashboards | 3 | 2 | 1 | 1 | Power BI, Tableau, dashboard creation, KPI tracking |
| 6 | Big Data Analytics Platforms | 1 | 2 | 3 | 1 | Spark, Hive, Pig, cloud Big Data services |
| 7 | Data Visualization Techniques | 3 | 1 | 1 | 1 | Visualization principles, storytelling, dynamic reports |
| 8 | Text Analytics and Social Media Analytics | 1 | 3 | 2 | 2 | Sentiment analysis, unstructured data mining |
| 9 | Big Data Security, Ethics, and Governance | 1 | 1 | 1 | 3 | Data privacy, ethics, compliance, governance |
| 10 | Case Studies, Applications, and Future Trends | 2 | 2 | 2 | 2 | Real-world applications, industry cases, emerging trends |

## 8. Mapping of the Course outcomes to Program Outcomes

| PO # | Program Outcome (PO) Description | CO1 | CO2 | CO3 | CO4 | Justification |
|---|---|---|---|---|---|---|
| PO1 | Demonstrate competence in commerce, social, information sciences, quantitative methods, and management domains. | 3 | 2 | 3 | 2 | CO1 and CO3 develop tool-based analytics competence; CO2 adds analytical depth; CO4 links ethics to data management. |
| PO2 | Identify, formulate, investigate, analyze, and solve complex business problems. | 3 | 3 | 3 | 2 | CO1–CO3 focus on solving real-world data problems; CO4 ensures ethical considerations in problem-solving. |
| PO3 | Design solutions for multi-dimensional corporate problems using contemporary techniques and tools. | 3 | 3 | 3 | 2 | CO1–CO3 support system design using BI, Big Data, and analytics tools; CO4 contributes to responsible solution design. |
| PO4 | Work effectively as a member and leader in multi-disciplinary teams. | 2 | 2 | 2 | 1 | CO1–CO3 encourage collaboration in data projects; CO4 has minimal direct impact on teamwork but supports shared ethical decisions. |

| PO5 | Communicate effectively with stakeholders as a manager. | 3 | 2 | 2 | 2 | CO1 enhances communication via dashboards; CO2–CO4 support clear reporting of analytics and ethical findings. |
|-----|-----|---|---|---|---|-----|
| PO6 | Apply ethical principles and make ethical choices for the enterprise, public, and society. | 1 | 1 | 2 | 3 | CO4 directly addresses ethical, security, and privacy issues in data; CO3 has a secondary role due to data handling impact. |
| PO7 | Engage in independent and life-long learning to evolve as responsible corporate leaders. | 2 | 3 | 3 | 3 | All COs promote life-long learning of emerging BI and Big Data technologies, ethics, and analytics methods. |

**(Semester IV)**
**Category: Elective**
[4 Credits: 40 Hrs]
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1. **Course Prerequisite:**

- Sound understanding of basic **statistical techniques** (classical inference).

- Basic familiarity with **stochastic modelling** (regressions, factor analysis)

2. **Course Learning Objectives:**
   After completion of the course, the students will be able to:

- **Explain** the role of Python in business data analytics, including fundamental programming concepts, data handling techniques, and core Python libraries used for analysis and visualization.

- **Analyze** datasets using Python by applying techniques such as data cleaning, exploratory data analysis (EDA), descriptive statistics, and predictive modeling to extract meaningful business insights.

- **Design** data-driven solutions through project-based applications by integrating data manipulation, statistical methods, and visualization techniques while addressing ethical and privacy considerations in analytics.

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures, hands on practical sessions in software and case discussions, student presentations, and a comprehensive final examination to achieve the stated objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

- Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

- Assignment: 10 Marks

- Attendance: 5 Marks
  **End-Semester Exam (60 Marks) -** Summative Assessment.

4. **Course Content:**
   **Course Name: Data Analytics Using Python**
   **Course Code: SM 402**
   **Hours per Week:** 4L
   **Credits:** 4

| Module I | |
|---|---|
| 1 | **Introduction to Data Analytics and Python** Understanding data analytics in business, need for Python, installing Python with Anaconda/Jupyter, first Python scripts | 4 |

| 2 | **Python Basics for Data Analytics** Data types, variables, control structures, functions, basic I/O, using libraries (numpy, pandas) | 4 |
|---|---|---|
| 3 | **Working with Data in Python** Importing CSV/Excel files, data cleaning, handling missing values, filtering and sorting data | 4 |
| 4 | **Data Manipulation Using Pandas** DataFrames, Series, indexing, slicing, grouping, pivot tables, merging datasets | 4 |
| 5 | **Data Visualization Using Python** Basic plots using matplotlib, advanced plots with Seaborn, interpreting visualizations | 4 |
| **Module 2** | | |
| 6 | **Exploratory Data Analysis (EDA)** Understanding data distribution, detecting outliers, correlation, business insight generation | 4 |
| 7 | **Descriptive and Inferential Statistics** Mean, median, mode, standard deviation, hypothesis testing (t-test, chi-square) using Python | 4 |
| 8 | **Predictive Analytics Using Python** Linear and logistic regression, train/test split, model accuracy and interpretation | 4 |
| 9 | **Business Case Study Applications** Retail, HR, Marketing analytics using real datasets in Python; project-based walkthroughs | 4 |
| 10 | **Ethical Issues, Trends, and Capstone Project** Data privacy, Python for dashboards, automated reports, future of analytics | 4 |

5. **Suggested Readings:**
   <u>**Textbooks:**</u>
   1. Agarwal, R. & Agarwal, A. (2021). *Data Analytics Using Python*. Wiley India.
   2. McKinney, W. (2018). *Python for Data Analysis*, 2nd Edition. O'Reilly Media.
   3. Raschka, S., & Mirjalili, V. (2020). *Python Machine Learning*, 3rd Edition. Packt Publishing.
   <u>**Textbooks:**</u>
   4. VanderPlas, J. (2016). *Python Data Science Handbook*. O'Reilly Media.
   5. Bhardwaj, R. K. (2020). *Data Science for Managers*. Sage Publications India.

6. **Course Outcomes**

| CO | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | **Explain** the role of Python in business data analytics, including fundamental programming concepts, data handling techniques, and core Python libraries used for analysis and visualization. | Comprehend Articulate, Interpret | Understand |

| CO 2 | **Analyze** datasets using Python by applying techniques such as data cleaning, exploratory data analysis (EDA), descriptive statistics, and predictive modeling to extract | Examine, Compare, Contrast | Analyze |
| | meaningful business insights | | |
| CO 3 | **Design** data-driven solutions through project-based applications by integrating data manipulation, statistical methods, and visualization techniques while addressing ethical and privacy considerations in analytics. | Design, Develop, Conceptualize | Create |

7. **Mapping of course outcomes to module/ course content**

| Module | CO1 | CO2 | CO3 |
|--------|-----|-----|-----|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | | 3- | - |
| 4 | - | 3 | - |
| 5 | - | 3 | - |
| 6 | - | 3 | - |
| 7 | - | 3 | |
| 8 | - | 3 | |
| 9 | - | - | 3 |
| 10 | - | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|-----|------|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 |

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**Course Name: Relational Database Management System**
**Course Code: SM-403**
**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**
   I. Understanding fundamental concepts of hardware, software, operating systems, and how data is stored and processed.
   II. Basic programming knowledge including variables, control structures, and functions, to help grasp SQL and procedural database elements.
   III. Awareness of how organizations use data in business processes, including basic exposure to concepts like transactions, reports, and decision-making systems.

2. **Course Learning Objectives:**
   I. Develop working knowledge of relational database systems by understanding core concepts including data models, table structures, keys, and integrity constraints, enabling evaluation of appropriate database solutions for business needs.
   II. Acquire hands-on skills to construct, execute, and optimize SQL queries (DDL/DML/DCL) for business data management, while implementing security controls and integrity constraints.
   III. Analyze modern database implementations (cloud services, AI integration, data warehouses) to recommend scalable, cost-effective solutions aligned with organizational intelligence requirements.

3. **Teaching methodology and evaluation system for the course:**
   A. **Teaching methodology –**
      - Lectures and Presentations
      - Interactive Discussion
      - Case Studies
      - Guest Lectures.

   B. **Evaluation System –**
      - Internal Assessment (25 Marks)
      - Assignment (10 Marks)
      - Attendance (5 Marks)
      - Internal Exam (40 Marks)- Summative Assessment [CIA1, CIA2]
      - End-Semester Exam (60 Marks)- Summative Assessment.

4. **Course Outcomes:**

By the end of this course, students will be able to –

- Demonstrate understanding of relational database concepts including data models, table structures, keys, and integrity constraints to evaluate appropriate database solutions for business scenarios."
- Construct and execute SQL queries (DDL, DML, DCL) to create, manipulate, and secure business data, while applying integrity constraints for data reliability.
- Design normalized database schemas (up to 3NF) using ER modeling, and justify denormalization decisions for performance optimization in real-world systems.

- Evaluate modern database trends (cloud services, AI integration, data warehousing) to recommend cost-effective, scalable solutions for business intelligence needs.

| CO # | Course Outcome (CO) | Action Verbs | Bloom's Level | Key Focus Areas |
|------|---------------------|--------------|---------------|-----------------|
| CO1 | Demonstrate understanding of relational database concepts including data models, table structures, keys, and integrity constraints to evaluate appropriate database solutions for business scenarios. | *Demonstrate, Evaluate* | **Understanding (L2), Evaluating (L5)** | Data models, keys, integrity constraints, business solutions |
| CO2 | Construct and execute SQL queries (DDL, DML, DCL) to create, manipulate, and secure business data, while applying integrity constraints for data reliability. | *Construct, Execute, Apply* | **Applying (L3), Analyzing (L4)** | SQL commands, data manipulation, security, integrity |
| CO3 | Design normalized database schemas (up to 3NF) using ER modeling, and justify denormalization decisions for performance optimization in real-world systems. | *Design, Justify* | **Creating (L6), Evaluating (L5)** | ER modeling, normalization, denormalization, performance tuning |
| CO4 | Evaluate modern database trends (cloud services, AI integration, data warehousing) to recommend cost-effective, scalable solutions for business intelligence needs. | *Evaluate, Recommend* | **Evaluating (L5), Creating (L6)** | Cloud databases, AI in DBMS, data warehousing, BI solutions |

## 5. Course Content:
**Course Name - Relational Database Management System**
**Course Code – SM 403**
**Hours per Week -** 4L:0T:0P
**Credits -** 4

| | MODULE I | |
|---|---|---|
| 1 | **Introduction:** Concept of data, information and DBMS. Understanding tables, records, attributes, keys, integrity constraints, and data independence. Concept of Hierarchical, Network, and Relational databases | **5L** |
| 2 | **Relational Data Model and Relational Algebra:** Data representation in RelationalAlgebra. SQL: DDL, DML, & DCL concepts, SQL commands | **5L** |
| 3 | **Integrity Constraints and DCL:** Entity, Referential and Domain Integrity, concept of triggers and stored procedures (theoretical concepts only); Database Control Language (concept of GRANT / REVOKE). | **4L** |
| 4 | **Normalization and ERD:** ER modelling [Entity-Relationship Diagrams (ERD), construction of tables], Functional Dependencies & Normalization (up to 3NF), Denormalization. | **6L** |
| 5 | **System Implementation Techniques:** Query Processing & Optimization (concept only). Transaction Processing Concepts, Concurrency Control and Recovery Techniques (concept only) | **5L** |
| 6 | **Indexing and Hashing:** Ordered indices (primary, secondary, dense, sparse, multilevel), concepts of hashing (static, dynamic) | **5L** |
| 7 | **Other Data Models**: Concept of Object–Oriented Databases, Distributed Databases & Client Server Architecture | **4L** |
| 8 | **Data Warehousing for Decisions:** OLAP, Case Study | **2L** |
| 9 | **Cloud Databases:** AWS RDS/Azure SQL: Managed database services Cost-Benefit: Cloud vs. on-premises for startups/enterprises | **2L** |
| 10 | **Databases with AI:** Chatbots that query databases Future trends - Voice-controlled databases | **2L** |

## 6. Suggested Readings:

- Fundamentals of Database System, Pearson Education by Elmasri, Navathe, Pearson Education
- Database System Concepts by Silberschatz, Korth, Sudarshan, McGraw Hill        International.
- An Introduction to Database System by C. J. Date, Pearson Education.
- Database Management System by Anand Tanvashi, Farzana Fathima, Rashmi S., Himalaya Publishing House.
- Relational        Database        Management        Systems by Dilip Tulshiramji Gaikwad, Ashish Shrivastava, Vrushali Rajendra Sonar, S. Chand

## 7. Mapping of course outcomes to module / course content

| Module # | Module Title | CO 1 | CO 2 | CO 3 | CO 4 | Key Focus Areas |
|---|---|---|---|---|---|---|
| 1 | Introduction: Concept of data, information and DBMS | 3 | 1 | 1 | 1 | Data models, tables, keys, integrity constraints |
| 2 | Relational Data Model and Relational Algebra | 3 | 3 | 1 | 1 | Relational algebra, SQL commands (DDL, DML, DCL) |
| 3 | Integrity Constraints and DCL | 3 | 3 | 1 | 1 | Entity, referential, domain integrity, GRANT/REVOKE |
| 4 | Normalization and ERD | 2 | 2 | 3 | 1 | ER diagrams, Functional dependencies, Normalization (3NF), Denormalization |
| 5 | System Implementation Techniques | 1 | 1 | 2 | 2 | Query processing, transactions, concurrency, recovery |
| 6 | Indexing and Hashing | 1 | 1 | 2 | 2 | Ordered indices, hashing techniques |
| 7 | Other Data Models | 2 | 1 | 1 | 3 | Object-oriented & distributed DB, client-server |
| 8 | Data Warehousing for Decisions | 1 | 1 | 1 | 3 | OLAP, data warehousing case study |
| 9 | Cloud Databases | 1 | 1 | 1 | 3 | Cloud DBMS (AWS RDS, Azure SQL), cost-benefit analysis |
| 10 | Databases with AI | 1 | 1 | 1 | 3 | AI integration, chatbots, voice-controlled DBs |

## 8. Mapping of the Course outcomes to Program Outcomes

| PO# | Program Outcome (PO) Description | CO 1 | CO 2 | CO 3 | CO 4 | Justification |
|---|---|---|---|---|---|---|
| PO1 | Competence in commerce, social and information sciences, quantitative methods, and management domains | 3 | 3 | 3 | 2 | Database systems are core to information management; SQL and DBMS knowledge integrate commerce and IT skills |
| PO2 | Identify, formulate, investigate, analyze and solve complex business problems | 3 | 3 | 3 | 2 | Query writing, relational models, normalization help analyze and solve data-driven business problems |

| PO3 | Design solutions for complex problems using systems, processes, and management tools | 2 | 3 | 3 | 3 | Designing schemas, ER diagrams, and applying AI/cloud databases reflect modern solution-building |
|---|---|---|---|---|---|---|
| PO4 | Work effectively in teams, preferably in multi-disciplinary settings | 1 | 2 | 2 | 3 | Database design and data analytics often require collaborative, cross-functional teamwork |
| PO5 | Communicate effectively with all stakeholders | 2 | 2 | 2 | 3 | Translating data queries into business reports or dashboards involves clear stakeholder communication |
| PO6 | Apply ethical principles and make ethical choices for enterprise and society | 2 | 2 | 2 | 2 | Data integrity, security (GRANT/REVOKE), and ethical data usage are covered in database management |
| PO7 | Engage in lifelong learning for evolving as corporate leaders | 2 | 2 | 3 | 3 | Keeping up with trends like cloud DBs, AI-driven data tools, and data warehousing is essential for lifelong learning |

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**
   ● Fundamentals of Business and Management
   ● Fundamental concepts of Business Mathematics and Statistics
   ● Understanding of Basic Economics

2. **Course Learning Objectives:**
   By the end of the course, students will:
   Understand Logistics Fundamentals and Organizational Integration
   Apply Inventory and Warehousing Strategies effectively
   Analyze Transportation and Global Logistics Operations effectively
   Design and Evaluate Supply Chain Networks
   Develop Collaborative and Coordinated Supply Chain Strategies

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   ● Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   ● Assignment: 10 Marks

   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name : Logistics and Supply Chain Management**
   **Course Code: SM 404**
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Hours |
|---|---|---|
| 1 | **Introduction to logistics management**- Definition, scope, functions, objectives - Integrated logistics management, role of logistics in the Supply chain - Logistics & customer service, Role of logistics in competitive strategy, Logistics organization & performance measurement, ERP –SAP - ORACLE | **3L** |
| 2 | **Inventory planning**- inventory costs, classifying inventory, Nature & importance of warehousing, types of warehouses, warehousing functions, warehouse layout & design. Material handling -objectives, guidelines & principles, selection of material handling equipments. Packaging-role of packaging, packaging materials, consumer & industrial packaging, material handling efficiency | **5L** |

| | | |
|---|---|---|
| 3 | **Transportation**- role of transportation in logistics, transportation selection decision, basic modes of transportation- Rail, Road, Water, Air, Pipeline- characteristics of different modes of transport economics - Inter modal operations | **4L** |
| 4 | **Containerization**-concept, types, benefits, Types of carriers- indirect & special carriers, Role of intermediaries- shipping agents, brokers- freight management- route planning Role of ports, ICDs, CONCOR - Global shipping options | **4L** |
| 5 | **Reverse logistics**- scope, design, e-logistics- logistics information system- application of IT in logistics- automatic identification technologies- bar coding, RFID, Logistics outsourcing3PL & 4PL, Global logistics- operational & strategic issues | **4L** |
| 6 | **Introduction to Supply Chain Management**- Supply chain – objectives – importance – decision phases – process view – competitive and supply chain strategies – achieving strategic fit – supply chain drivers – obstacles – framework – facilities – inventory – transportation – information – sourcing – pricing | **3L** |
| 7 | **Designing the Supply Chain Network**- Designing the distribution network – role of distribution – factors influencing distribution – design options – e-business and its impact – distribution networks in practice – network design in the supply chain – role of network – factors affecting the network design decisions – modeling for supply chain. | **6L** |
| 8 | **Planning Demand and Supply**- Role of forecasting – demand forecasting – approaches – role of IT.<br>**Planning and Managing Inventories**- Safety inventory and its appropriate level – impact of supply uncertainty, aggregation and replenishment policies. | **4L** |
| 9 | **Transportation Networks and Sourcing**- Role of transportation – modes and their performance – transportation infrastructure and policies - design options and their trade-offs – Tailored transportation. Sourcing – In-house or Outsource – 3 rd and 4th PLs – supplier scoring and assessment. | **4L** |
| 10 | **Coordination in a Supply Chain**- Lack of supply chain coordination and the Bullwhip effect – obstacle to coordination – managerial levels – building partnerships and trust – continuous replenishment and vendor-managed inventories – collaborative planning, forecasting and replenishment. | **3L** |

**5. Suggested Readings**

1. Ailawadi C Sathish & Rakesh, LOGISTICS MANAGEMENT, Prentice Hall, India, 2005
2. Agrawal D K, LOGISTICS & SUPPLY CHAIN MANAGEMENT , Macmillan India Ltd, 2003
3. Coyle et al., THE MANAGEMENT OF BUSINESS LOGISTICS, Thomson, 7th ed., 2004
4. Bowersox Donald J, LOGISTICAL MANAGEMENT- THE INTEGRATED SUPPLY CHAIN PROCESS, Tata McGraw Hill, 2000
5. Sunil Chopra and Peter Meindl, SUPPLY CHAIN MANAGEMENT – STRATEGY, PLANNING AND OPERATION, PHI, 4th Edition, 2010.
6. Wisner, Keong Leong and Keah-Choon Tan, PRINCIPLES OF SUPPLY CHAIN MANAGEMENT A BALANCED APPROACH, Thomson Press, 2005..
7. Coyle, Bardi, Longley, THE MANAGEMENT OF BUSINESS LOGISTICS – A SUPPLY CHAIN PERSPECTIVE, Thomson Press, 2006.
8. Jeremy F Shapiro, MODELING THE SUPPLY CHAIN, Thomson duxbury 2002

## 6. COURSE OUTCOMES:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO 1** | Explain logistics management concepts and apply them to real-world scenarios involving warehousing, inventory planning, and material handling. | Discuss, Determine, Examine | Understand and Apply |
| **CO 2** | Analyze transportation modes, logistics intermediaries, and global shipping; evaluate reverse logistics, outsourcing, and e-logistics for supply chain optimization. | Estimate, Evaluate | Analyze and evaluate |
| **CO 3** | Understand supply chain components and strategies, and apply them to design effective supply and distribution networks. | Develop, examine | Understand and apply |
| **CO 4** | Analyze demand forecasting, inventory planning, transportation, and sourcing; evaluate strategies to improve supply chain coordination and collaboration. | Estimate, Evaluate | Analyze and evaluate |

## 7. Mapping of course outcomes to module / course content

| Module | CO1 | CO2 | CO3 | CO4 |
|---|---|---|---|---|
| 1 | 3 | - | - | - |
| 2 | 3 | - | - | - |
| 3 | - | 3 | - | - |
| 4 | - | 3 | - | - |
| 5 | - | 3 | - | - |
| 6 | - | 1 | 2 | 3 |
| 7 | - | 2 | 3 | - |
| 8 | - | - | - | 3 |
| 9 | - | - | - | 3 |
| 10 | - | 2 | - | 3 |

8. **Mapping of the Course outcomes to Program Outcomes**

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CO1 | 3 | 3 | 3 | 2 | 1 | 1 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 1 | 1 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 1 | 1 | 2 |

**Course Name: Advanced Mathematical Modeling for Managerial Decisions**

**Course Code: SM-405**

**(Semester IV)**
**Category: Elective**
**[4 Credits: 40 Hrs]**

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1. **Course Prerequisite:**
   Basic knowledge of Statistics
   Understanding of Mathematical Foundations
   Basic probability theory

2. **Course Learning Objectives:**
   By the end of the course, students will:
   > Understand and Apply Mathematical Modeling Techniques
   > Analyze and Interpret Numerical and Probabilistic Data
   > Evaluate and Synthesize Decision-Making Models
   > Evaluate Statistical Studies and Their Ethical Implications
   > Develop Decision Models Using Recursive and Functional Approaches

3. **Teaching methodology and evaluation system for the course:**
   **Teaching methodology –** The course uses lectures and case discussions, student presentations, and a comprehensive final examination to achieve these objectives.
   **Evaluation System – Continuous Internal Assessment (Twice in a semester)**
   CIA1 and CIA2 **(Total: 40 Marks each)**

   ● Class Test (Objective + Subjective): 25 Marks (Duration: 1 hour)

   ● Assignment: 10 Marks

   ● Attendance: 5 Marks
   **End-Semester Exam (60 Marks)-** Summative Assessment.

4. **Course Content:**
   **Course Name :** Advanced Mathematical Modeling for Managerial Decisions
   **Course Code :** SM 405
   **Hours per Week:** 4L
   **Credits:** 4

| Sl. No. | Topic | Hours |
|---|---|---|
| 1 | **Introduction**: Classification of Mathematical Models, The Modeling Process, Proportionality, Model Fitting. | **3L** |
| 2 | Probabilistic Modeling, Linear and Nonlinear Regression, Multiple Linear Regression Modeling. | **4L** |
| 3 | **Mechanistic Models**: General Idea of ODEs, Setting Up ODE Models, Some Theories, Closed Form Solutions, Some Numerical Solutions. | **4L** |

| | | |
|---|---|---|
| 4 | **Mechanistic Models Continued**: Fitting ODEs to Data, Limitations of ODE Models, Some Theory You Should Know, Closed Form Solutions. | **4L** |
| 5 | **Other Modeling Approaches**: Difference Equations, Simulation Modeling, Dimensional Analysis, Related Problems. | **4L** |
| 6 | **Analyzing Numerical Data**: Types and Sources of Numerical Data, Data Collection and Sampling, Data Cleaning and Preparation, Descriptive Statistics, Data Visualization. | **4L** |
| 7 | **Probability**: Fundamentals of Probability, Rules of Probability, Conditional Probability, Probability Distributions, Applications of Probability in Data Analysis. | **6L** |
| 8 | **Statiatical studies**: Introduction to Statistical Studies, Study Design, Data Collection Methods, Bias and Errors in Studies, Experimental Design, Ethics in Statistical Studies. | **3L** |
| 9 | **Recursion in Models and Decision Making**: Fundamentals of Recursion, Recursive Models in Mathematics, Dynamic Programming and Recursive Decision Models, Markov Decision Processes (MDPs), Recursive Algorithms in Optimization, Applications in Real-World Decision Making. | **4L** |
| 10 | **Functions in Models**: Linear Functions and Decision Models and Decision Making: Introduction to Functions in Modeling, Nonlinear Functions in Decision Making, Piecewise and Step Functions, Multivariable Functions in Decision Making, Applications of Functions in Real-World Decision Making. | **4L** |

### 5. Suggested Readings:

1. E.A. Bender, An Introduction to Mathematical Modeling, Courier Corporation, Massachusetts, 2000.

2. L. Edelstein-Keshet, Mathematical Models in Biology, Society for Industrial and Applied Mathematics, 2005.

3. A. Friedman and C.-Y.Kao, Mathematical Modeling of Biological Processes, Springer Cham, Heidelberg, 2014.

4. F.R. Giordano, W.P. Fox, and S.B. Horton, A First Course inMathematicalModeling,5th ed., Cengage Learning, United States,2013.

5. S. Heinz, Mathematical Modeling, Springer, Heidelberg, 2011.

6. S.M. Moghadas and M. Jaberi-Douraki, Mathematical Modeling: A Graduate Textbook, John Wiley & Sons, New Jersey, M 2018.

7. C. Moler, Numerical Computing with Matlab. SIAM,2004.

8. A. Quarteroni and P. Gervasio, A Primer on Mathematical Modelling, Springer Nature, Switzerland,2020.

9. K.-K.Tung, Topics in Mathematical Modeling, Princeton University Press, New Jersey, 2007.

10. K. Velten, Mathematical Modeling and Simulation: Introduction for Scientists and Engineers, Wiley-VCH VerlagGmbH& Co., Germany, 2009.

11. T. Witelski and M. Bowen, Methods of Mathematical Modelling: Continuous Systems and Differential Equations, SpringerCham, Heidelberg, 2015.

## 6. COURSE OUTCOMES:

| Course Outcomes | Details/Statement | Action Verb | Knowledge Level |
|---|---|---|---|
| **CO1** | Understand mathematical models and apply regression, ODEs, and simulation to solve real-world problems. | Discuss, Determine, Develop | Understand, apply and create |
| **CO2** | Apply data analysis and probability to manage and interpret numerical data, and assess design and ethics in statistical studies. | Examine, Estimate | Apply and evaluate |
| **CO3** | Analyze and evaluate recursive models like dynamic programming and MDPs to support optimal decision-making in complex scenarios. | Devise, Decide | Analyze and evaluate |

## 7. Mapping of course outcomes to module / course content

| Module | CO1 | CO2 | CO3 |
|---|---|---|---|
| 1 | 3 | - | - |
| 2 | 3 | - | - |
| 3 | 3 | - | - |
| 4 | 3 | - | - |
| 5 | 3 | - | - |
| 6 | - | 3 | - |
| 7 | - | 3 | - |
| 8 | - | 3 | - |
| 9 | | | 3 |
| 10 | | | 3 |

## 8. Mapping of the Course outcomes to Program Outcomes

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 2 | 1 | 1 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 1 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 |