Proposed Structure and Scheme of Evaluation

for

MASTER OF BUSINESS ADMINISTRATION
(BUSINESS ANALYTICS)

Delhi School of Management

DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Shahbad Daulatpur, Main Bawana Road, Delhi-110042, India

(proposed to be effective from AY 2025-26)

Contents

Delhi School of Management
Delhi Technological University

Vision
To be among the leading world class management education and research institutions for meeting the contemporary and emerging challenges of business and society.

Mission
M1: To develop socially responsible and ethically driven innovative managers and future leaders.

M2: To evolve a system of quality education and research in management through sustained institutionalized efforts of students and faculty.

M3: To equip the students with contemporary and emerging developments in the field of management.

About the Department

Delhi School of Management (DSM), established in 2009, extends the legacy of Delhi College of Engineering (DCE) by fostering innovation and excellence in management education. DSM offers a comprehensive suite of programs including Master of Business Administration (MBA), MBA (Business Analytics), MBA (Entrepreneurship, Innovation, and Venture Development), MBA (Executive) and Ph.D. programs. Accredited by NBA, DSM supports DTU's engineering departments and provides a state-of-the-art learning environment with industry driven curricula, internships, and networking opportunities. Emphasizing entrepreneurship, ethical leadership, and experiential learning, DSM integrates guest lectures, field projects, and live case studies into its pedagogy. A vibrant campus life enriched with business quizzes, debates, cultural activities, and sports events fosters holistic development. With a diverse student body, experienced faculty, and ever-expanding facilities, DSM continues to develop socially responsible, technologically adept leaders equipped for sustainable business solutions.

About the Program - MBA (Business Analytics)

The MBA (Business Analytics) is a dynamic two-year full-time professional degree program that strategically integrates a robust management curriculum with in-depth, practical training in business analytics. Built upon DTU's technological prowess, the program fosters new perspectives and advanced skills essential for enhancing business outcomes through analytical expertise. The program's core objective is to develop future-ready professionals who can operate fluently at the intersection of management and analytics, harnessing cutting-edge technologies to drive impactful decisions. The program's structure provides a strong grounding in both management and analytics fundamentals, with opportunities of wide range of elective courses in later semesters to gain deep insights.

Program Educational Objectives (PEOs)

PEO1: To equip students with subject knowledge and expertise of managerial functions.

PEO2: To develop critical and a holistic approach among students for designing and implementing solutions to problems of business, government and society.

PEO3: To nurture the spirit of innovation, creativity and entrepreneurship among students.

PEO4: To develop effective communication, interpersonal, motivational, decision making and leadership skills among students.

PEO5: To inculcate value-based leadership, ethical qualities and a sense of social purpose among students.

Program Outcomes (POs)

The MBA (Business Analytics) graduates will be able to:

PO1: Integrate core management concepts across various functional areas with the fundamental principles and techniques of business analytics to address complex business challenges.

PO2: Foster analytical and critical thinking abilities for data-based decision making.

PO3: Identify opportunities to leverage data analytics for addressing social and environmental challenges aligned with organizational values and broader societal well-being.

PO4: Communicate complex data-driven insights and recommendations effectively through visual aids, reports, and presentations.

PO5: Lead and inspire teams of data scientists, analysts, and business professionals, fostering collaboration and ensuring the successful execution of data analytics projects.

PO6: Aware and sensitive to ethical considerations and societal impact of data collection, analysis, and the use of business intelligence.

Program Specific Outcomes (PSOs)

The MBA (Business Analytics) graduates will be able to:

PSO1: Apply a wide range of advanced statistical models (e.g., time series analysis, multivariate analysis) and machine learning algorithms (e.g., supervised, unsupervised, reinforcement learning) to solve complex business problems and extract predictive insights from data.

PSO2: Able to use relevant industry-standard softwares, and programming languages to perform data analysis, build analytical models, and communicate insights effectively.

Definition of key words

(a) In this document, unless the contents otherwise require–

(i) "AC" and "Council" shall mean the Academic Council of the Delhi Technological University.

(ii) "BoM" shall mean the Board of Management of the University.

(iii) "BoS" shall mean Board of Studies of the Department/School.

(iv) "CGPA" shall mean the Cumulative Grade Point Average.

(v) Department shall mean a department of studies of the university.

(vi) School shall mean a school of studies of the university.

(vii) "SGPA" shall mean the Semester Grade Point Average.

(viii) "Student" shall mean a student registered for undergraduate or post graduate program.

(ix) "University" shall mean the Delhi Technological University.

(x) "UTTC" shall mean University Time Table Committee.

(b) Words and expressions used but not defined in this document and defined in the Act and Statutes, shall have the same meaning as assigned to them in the Act or Statute.

Pedagogical Notes

Entrepreneurial thinking will be promoted in the delivery of various courses.

Case study approach as a critical learning tool will be thoroughly used to enhance the student abilities in delineating critical thinking dilemmas faced by organizations, help them in applying concepts and solve practical problems.

Predictive and real-life exposure will be provided to the students at all levels.
In addition to the focus on the corporate sector, exposure to the social sectors and public policy issues will be suitably incorporated in the delivery of the curriculum.

Students will be trained in innovative and out-of-box thinking in various courses to meet workplace challenges in the VUCA world.

The whole curriculum will be delivered in the ethical contexts and will emphasize human values.
The delivery will incorporate global contexts for wider perspectives and thinking.

The overall delivery will to provide an integrated and holistic foundation of the different fields of business management with a clear focus on problem-solving.

Throughout the curriculum delivery, the emphasis will be on developing leadership skills through practical exercises.

Successful Indian business models will be shared with students in different courses.
Contemporary pedagogical tools like Moderator-Supported Learner Approaches, Simulation Exercises and Crossword Play will be used to enhance learning experience.

The learning pedagogy will be complemented with self-learning tools such as poster sessions, break-and- build and free-fall learning and innovative business education methods including design thinking, project- based learning, contemplative practices, assumption-busting and theatre techniques to deepen learning.

Process Followed in the Revision of the Syllabus

Stage-I

Formation of a core committee for Course Revision with an objective to generate ideas and inputs and provide direction for the revision of the structure, credits and contents etc.

Stage-II

Discussions with experts from industry and academia to provide domain specific input under their respective areas.

Stage-III

Feedback from stakeholders including teachers, students, and alumni

Stage-IV

Revision of framework based on the feedback

Stage-V

Approval by Board of Studies

Stage-VI

Proposal for the Approval of Academic Council

Details of Credit Distribution

Semester	Core Courses	Elective Courses	Value Added Courses (VAC)	Skill Enhancement Courses (SEC)	Research Project/Industrial Training
I	20				
II	16			4	
III	6	8		2	4
IV	4	8	2		6
Total	46	16	2	6	10
Total- 80 credits					

Semester Wise Scheme of the Programme

FIRST SEMESTER														
Sl. No.	Course		Discipline	Credits	Contact Hours			Exam Duration (Hrs)		Relative Weights				
	Code	Title			L	T	P	ETE	PRE	CWS	PRS	MTE	ETE	PRE
1		Organizational Behavior and Human Resource Management	Core	4	4	0	0	3	0	25	0	25	50	0
2		Fundamentals of Finance	Core	4	4	0	0	3	0	25	0	25	50	0
3		Business Statistics	Core	4	3	0	2	3	0	15	25	20	40	0
4		Fundamentals of Business Analytics	Core	4	3	0	2	3	0	15	25	20	40	0
5		Database Management System	Core	4	3	0	2	3	0	15	25	20	40	0
		TOTAL		**20**										

SECOND SEMESTER														
Sl. No.	Course		Discipline	Credits	Contact Hours			Exam Duration (Hrs)		Relative Weights				
	Code	Title			L	T	P	ETE	PRE	CWS	PRS	MTE	ETE	PRE
1		Business Research Methods	Core	4	3	0	2	3	0	15	25	20	40	0
2		Marketing Management	Core	4	4	0	0	3	0	25	0	25	50	0
3		Operations and Supply Chain Management	Core	4	4	0	0	3	0	25	0	25	50	0
4		Data Warehousing	Core	4	4	0	0	3	0	25	0	25	50	0

5		Introduction to Programming using Python	SEC	4	3	0	2	3	0	15	25	20	40	0
				and Data Mining										
		TOTAL		20										

THIRD SEMESTER

Sl. No.	Course		Discipline	Credits	Contact Hours			Exam Duration (Hrs)		Relative Weights				
	Code	Title			L	T	P	ETE	PRE	CWS	PRS	MTE	ETE	PRE
1		Machine Learning	Core	4	4	0	0	3	0	25	0	25	50	0
2		Managerial Economics	Core	2	2	0	0	3	0	25	0	25	50	0
3		Introduction to R programming	SEC	2	0	0	4	0	3	0	50	0	0	50
4		Elective 1	Elective	4	4	0	0	3	0	25	0	25	50	0
5		Elective 2	Elective	4	4	0	0	3	0	25	0	25	50	0
6		Industrial Training	Ind. Training	4										100
		Total		20										

FOURTH SEMESTER

Sl. No.	Course		Discipline	Credits	Contact Hours			Exam Duration (Hrs)		Relative Weights				
	Code	Title			L	T	P	ETE	PRE	CWS	PRS	MTE	ETE	PRE
1		Big Data Analytics	Core	4	4	0	0	3	0	25	0	25	50	0
2		Data Governance and Ethics	VAC	2	2	0	0	3	0	25	0	25	50	0
3		Elective 3	Elective	4	4	0	0	3	0	25	0	25	50	0
4		Elective 4	Elective	4	4	0	0	3	0	25	0	25	50	0
5		Major Research Project		6										100
		Total		20										

LIST OF ELECTIVES	
Electives – 1 & 2	Strategic Human Resource Management
	Compensation Management
	Business Systems Analysis and Design
	E-business
	Financial Statement Analysis
	Project Appraisal and Finance
	Marketing of Services
	Consumer Behaviour
	Total Quality Management
	Logistics Management
	Legal Aspects of Business
	Strategic Management
	Knowledge Creation, Critical Thinking and Innovation
	Project Management
	Desing Thinking and Product Development
	Intellectual Property Rights
	Corporate Governance
	Entrepreneurship Development
	Natural Language Processing
	Recommender Systems
	Optimization Techniques
Electives – 3 & 4	Advanced Machine Learning
	Advance DBMS
	Generative Artificial Intelligence
	Deep Learning
	Swarm Optimization and Evolutionary Computing
	Semantic Web Mining
	GPU computing
	Marketing Analytics
	Financial Analytics
	HR Analytics
	Operations Analytics

	Security Analytics
	Healthcare Analytics
	Sports Analytics
	Weather Analytics

Note:

1. After completion of first year courses successfully, the student will get Post Graduate Diploma in Business Analytics on exit from the program.

2. A student is allowed to earn a maximum of 16 credits from the MOOCs/NPTEL against the courses in III and IV semesters. The list of such courses shall be made available at the beginning of the semester before registration.

3. The Research Project is required to be done individually under one internal and one external mentor. A maximum of five students will be allocated to each team of internal/external mentors. The honorarium to mentors shall be paid as per the University norms.

4. Electives will be offered based on the choice of students. However, as per the policy, a particular elective will be offered only when the required minimum numbers of students register for the course. The department may also restrict some of the combinations of specialization/electives keeping in view the industry trend, job opportunities, slots available in the time table and students' preferences.

FIRST SEMESTER

Organizational Behavior and Human Resource Management

Course Objectives
1. To introduce students to the fundamental concepts, theories, and dynamics of individual and group behavior within organizational settings.
2. To provide a comprehensive overview of the key functions and strategic importance of Human Resource Management throughout the employee lifecycle.
3. To equip students with the ability to apply core principles and techniques in essential HRM areas.
4. To develop students' understanding of leadership dynamics, organizational culture, change management, and the factors influencing employee relations and well-being.
5. To enable students to analyze the interplay between individual behavior, management practices (HRM), and organizational outcomes.

Course Outcomes
Upon successful completion of the course, the student should be able to:
1. Define key concepts in organizational behavior, such as individual behavior, personality, perception, learning, values, attitudes, motivation, and interpersonal dynamics.
2. Explain various leadership theories and styles, and describe the nature and forces of organizational culture, change, and stress management.
3. Apply the principles of human resource management, including strategic HRM, job analysis, recruitment, selection methods, and the development of high-performance work systems.
4. Analyze training and development needs, design training programs, and evaluate performance management systems, including career planning, succession planning, and compensation management.
5. Examine industrial relations concepts, including discipline, collective bargaining, work-life quality, employee welfare programs, and the management of separation and attrition.

Unit 1: Organization Behavior: An Introduction, Behavioural Dynamics
Foundations of individual behavior, Personality, Perception, Learning, Values, Attitudes, Motivation, Interpersonal Dynamics, Teamwork and Group Dynamics; Leadership theories and styles. Management of conflict and negotiation.

Unit 2: Organizational Culture and Change
Organizational culture, Organizational change: nature and forces of change, resistance to change: and management of resistance to change; organizational power and politics; toxic workplace; workplace diversity; and Work stress: sources and consequences of stress and its management.

Unit 3: Human Resource Management- concept

The Role of Human Resource Management in a competitive business environment; Strategic Human Resource Management, Creating high-performance work systems, Practices and applications of HRM, International Human Resources Management.

Unit 4: Human Resource planning & selection

Objectives, Importance & Problems of HR Planning; Job analysis – concept and Techniques, Job Description, The process of forecasting- concept, techniques, Human Resource Auditing, Human Resource Accounting. Concept, identifying job recruitments, recruitment resources, and efficacy. Selection, process, and methods.

Unit 5: Training and Development

Training and development concept, need, strategy, Identification of needs, designing & implementing training programs Management Development, Evaluation of Training & development

Unit 6: Performance and Compensation Management

Performance Management – Concept and Practices Principle and Objectives of Performance Appraisal and potential Evaluation, Feedback. Career planning, Succession Planning & Talent Management. Compensation Management, Job Evaluation, Transfer, Promotion and Reward Policies.

Unit 7: Industrial Relations

Definition, concept, context of Industrial Relations, new wage codes, Discipline (Red hot stove principle of discipline, counseling, collective bargaining, Quality of work life; Safety and Health, Employee Welfare, Employee Assistance Programmes, Separation, Attrition.

Text books:
- Robbins, S. P., Judge, T. A., Edwards, M., Sandiford, P., Fitzgerald, M., & Hunt, J. (2019). Organisational behaviour (9th ed.). Pearson.
- Nahavandi, A., Denhardt, R. B., Denhardt, J. V., & Aristigueta, M. P. (2015). Organizational behavior. Sage Publications.
- Dessler, G., & Varkkey, B. (2015). Human resource management (14th ed.). Pearson Education.
- Denisi, A., Griffin, R., & Sarkar, A. (2014). HR. Cengage Learning (India Edition).

Reference Books:
- DeCenzo, D. A., & Robbins, S. P. (2022). Fundamentals of human resource management (14th ed.). John Wiley.
- Torrington, D., Hall, L., Taylor, S., & Atkinson, C. (2024). Human resource management (12th ed.). Pearson Education.
- Greenberg, J., & Baron, R. A. (2017). Behavior in organizations. Pearson Education.
- Newstrom, J. W., & Davis, K. (2014). Organizational behavior at work. Tata McGraw Hill.
- Ivancevich, J. M. (2014). Human resource management (10th ed.). Tata McGraw Hill.
- Byars, L. L., & Rue, L. W. (2014). Human resource management (10th ed.). Tata McGraw Hill.
- Nelson, D. L., Quick, J. C., & Khandelwal, P. (2014). ORGB (2nd ed.). Cengage Learning.
- George, J. M., & Jones, G. R. (2012). Understanding and managing organizational behaviour (6th ed.). Pearson Education.

Fundamentals of Finance

Course Objectives:
1. To introduce the foundational concepts of financial management.
2. To explain fundamental accounting principles, and demonstrate the systematic process of preparing and structuring key financial statements.
3. To equip students with analytical techniques for interpreting financial statements, and cash flow statement evaluation.
4. To develop understanding and application skills in core corporate finance decisions.
5. To introduce managerial decision-making tools, and apply these techniques to practical scenarios.

Course Outcomes

Upon successful completion of the course, the student should be able to:
1. Understand the functions, scope, and objectives of financial management, including the time value of money, risk-return concepts, and the basics of equity and bonds.
2. Demonstrate knowledge of accounting principles, including GAAP, accounting standards, and the preparation and drafting of financial statements.
3. Apply financial decision-making concepts, such as capital structure, cost of capital estimation, working capital management, and dividend policy decisions.
4. Analyze and interpret financial statements using various techniques like ratio analysis, Du Pont Chart, horizontal and vertical analysis, and cash flow statements.
5. Utilize relevant costing techniques, such as cost-volume-profit (CVP) analysis, and make informed decisions regarding make-or-buy, product discontinuation, and special orders.

Unit 1: Overview of Finance Functions

Financial management: Functions, scope and objectives, Environment of Financial Management; Time Value of Money – Annuity and present value of different types of cash flows, concept of Risk and Return, Equity & Bonds - YTM.

Unit 2: Preparation of Financial Statements

Introduction to Accounting: Importance, Accounting Concepts and conventions, (GAAP)., Accounting Standards, Accounting Process - Books of Original Record. Ledger & Trial Balance, Classification of Capital and Revenue expenses, Concepts and contents of financial statements and drafting of Financial Statements

Unit 3: Financial Decision-Making

Financing Decision - Capital Structure, The concept of Operating, Financial and Combined Leverage; Designing the capital structure; Concepts and estimation of Cost of Capital- WACC; Investment Decision - Estimation of Cash Flows, Project evaluation techniques: Discounting Methods and non-Discounting techniques; Working Capital Decision - Concept of Working Capital - Fixed and Fluctuating, Gross vs Net, Factors affecting Working Capital Management; Working Capital gap; Dividend Decision - Retained Earnings and Dividend Decision; Theories related to dividend policy; Dividend Policy Decision

Unit 4 Financial Statement Analysis

Users of financial statement, Techniques of analysis and interpretation of financial statements: Ratio Analysis; Liquidity, Leverage, Solvency and Profitability ratios – Du Pont Chart -. Horizontal Analysis and Vertical Analysis, statement of changes in Financial position: Cash flow statement, Working capital changes.

Unit 5 Relevant Costing for Decision-Making

Cost classification and Behaviour, Cost-Volume-Profit (CVP) Analysis, Make-or-buy decisions, product discontinuation, and special order decisions, Sunk costs and opportunity costs

Text Books:
- Brealey, R. R., Myers, S. C., Allen, F., & Mohanty, P. (2014). Principles of corporate finance (8th ed.). Tata McGraw Hill.
- Pandey, I. M. (2013). Financial management (11th ed.). Vikas Publishing House.

- Narayanswamy, R. (2012). Financial accounting: A managerial perspective. PHI Learning Private Limited.
- Horngren, C. T., Datar, S. M., & Rajan, M. V. (2011). Cost accounting: A managerial emphasis (13th ed.). Prentice Hall of India.

Reference Books:
- Anthony, R. N. (1999). Essentials of accounting (7th ed.). Prentice Hall.
- Fleuriet, M. (2018). Investment banking explained: An insider's guide to the industry (2nd ed.). McGraw-Hill Education.
- Krantz, M., & Johnson, R. R. (2020). Investment banking for dummies (2nd ed.). John Wiley & Sons.

Business Statistics

Course Objectives:
1. To introduce fundamental concepts and techniques of descriptive and inferential statistics, emphasizing their application to analyzing business data and deriving actionable insights.
2. To equip students with the skills of data manipulation, and analysis.
3. To develop students' understanding of statistical modeling principles, enabling them to build, interpret, and evaluate models for business forecasting and informed decision-making.
4. To foster students' abilities to clearly and effectively communicate complex statistical findings and their business implications.

Course Outcomes:
Upon successful completion of the course, the student should be able to:
1. Apply descriptive and inferential statistics to analyze business data and draw meaningful conclusions.
2. Perform data analysis and generate relevant reports for business applications.
3. Develop and interpret statistical models to support business forecasting and decision-making.
4. Communicate statistical insights effectively.

Unit1: Descriptive statistics
Role of statistics in management, Measures of central tendency and dispersion, outlier analysis, covariance and correlation, Applications in Business.

Unit 2: Probability distributions
Introduction to probability theory, random variables, Probability distributions - continuous and discrete, binomial, Poisson, Normal, Student's t, F, Chi-square, Exponential.

Unit3: Statistical estimation, hypothesis testing
Sampling distributions, Point and interval estimation, Hypothesis testing: Z-test and t-test (test of one sample mean, proportions), Analysis of Variance (ANOVA), Non-parametric tests: Chi-square test (goodness of fit test)

Unit 4: Regression and time series analysis
Simple linear regression, multiple linear regression, logistic regression, binomial regression, quadratic regression model, time-series forecasting models

Text Books:
- Keller, G., & Malhotra, G. (2018). Statistics for management and economics (11th ed.). Cengage Learning.
- Levine, D. M. (2017). Statistics for managers using Microsoft Excel (8th ed.). Pearson Education India.

- Vohra, N. D. (2017). Quantitative techniques in management (5th ed.). Tata McGraw Hill Publications.

Reference Books:
- Hiller, F. S., Lieberman, G. J., Nag, B., & Basu, P. (2024). Introduction to operations research (11th ed.). McGraw Hill Education.
- Stair, R. M., Hanna, M. E., Hale, T. S., & Badri, T. N. (2023). Quantitative analysis for management (14th ed.). Pearson Education.
- Aczel, A., Sounderpandian, J., & Saravanan, P. (2017). Complete business statistics (7th ed.). Tata McGraw-Hill Education.

Fundamentals of Business Analytics

Course Objectives:
1. To introduce the fundamental concepts and demonstrate the critical role of effective business analytics for organizational success.
2. To equip students with the knowledge and skills to utilize analytical tools for the in-depth examination and interpretation of intricate business problems.
3. To enable students to formulate and apply various optimization models to solve business decision problems.
4. To develop a comprehensive understanding of principles and practical application of descriptive, predictive, and prescriptive business analytics.

Course Outcomes:
Upon successful completion of the course, the student should be able to:
1. Understand the need for effective business analytics within an organization.
2. Analyze complex problems using advanced analytics tools.
3. Apply various optimization models such as linear optimization, integer linear optimization and non-linear optimization.
4. Demonstrate descriptive, predictive and prescriptive business analytics.

Unit1: Introduction and Data Visualization

Introduction: Decision making, Business analytics defined, Big data, Business analytics in practice. Descriptive Statistics: Overview of using data: definitions and goals, types of data, modifying data in excel, creating distributions from data, measures of location and variability, analyzing distribution, measures of association between two variables. Data Visualization: Overview, Tables, Charts, Advanced data visualization, data dashboards.

Unit 2: Spreadsheet Models and Linear Optimization Models

Spreadsheet Models: Building good spreadsheet models, what if analysis, excel functions for modeling, auditing spreadsheet models. Linear optimization models: Minimization problem, solving the par. Inc problem, maximization problem, special cases of linear program outcomes, sensitivity analysis, general linear programming notation.

Unit3: Integer Linear Optimization Models and Nonlinear optimization Models

Types of Integer linear optimization models, eastborne realty example, solving using excel solver, application involving binary variables, modeling flexibility provided by binary variables, generating alternatives. Nonlinear optimization models: a production application, local and global optima, a location problem, Markowitz portfolio model, forecasting adoption of a new product.

Unit4: Monte Carlo Simulation and Decision Analysis

Monte Carlo Simulation: Risk Analysis for Santonics LLC, Simulation modeling for land Shark Inc., Simulation considerations. Decision analysis: Problem Formulation

Unit 5: Business Analytics Applications

Why resource constraints are important to support business analytics: introduction, business analytics personnel, business analytics data, Descriptive: Visualizing and exploring data, sampling and estimation, Predictive: Logic Driven Models, data driven models, data mining. Prescriptive Analysis: Prescriptive modeling: non-linear optimization.

Unit 6: Measures & metrics and Performance Management

Need for measurement, characteristics of measures, measurement system terminology, Salient attributes of a good metric, SMART test for ensuring metric relevance to business, Supply chain associated with the metric, Fact-based decision making and KPIs, Few sample KPIs used by Human Resource (HR) division, Mapping metrics to business phases KPIs, and Performance Management

Text Books:
- Camm, J. D., Cochran, J. J., Fry, M. J., Ohlmann, J. W., & Anderson, D. R. (2015). Essentials of business analytics (2nd ed.). Cengage Learning.
- Schniederjans, M. J., Schniederjans, D. G., & Starkey, C. M. (2014). Business analytics: Principles, concepts and applications. Pearson
- Prasad, R. N., & Acharya, S. (2011). Fundamentals of business analytics. Wiley.

Reference Books:
- Liebowitz, J. (2013). Business analytics: An introduction. Auerbach Publications.
- Hardoon, D. R., & Shmueli, G. (2016). Getting started with business analytics. CRC Press, Taylor & Francis.
- Rao, P. H. (2014). Business analytics: An application focus. Prentice Hall India.
- Provost, F., & Fawcett, T. (2013). Data science for business: What you need to know about data mining and data-analytic thinking. O'Reilly Media.
- Pinsky, M. A., & Karlin, S. (2010). An introduction to stochastic modeling (4th ed.). Academic Press.

Database Management System

Course Objectives:
1. To introduce the foundational principles of data modeling and database systems
2. To equip students with the ability to analyze real-world requirements and design effective database models and schemas.
3. To explain the fundamentals of SQL, enabling students to formulate and execute SQL queries for defining database structures, manipulating data, retrieving information, and performing data analysis.
4. To discuss the significance of database normalization and several implementation aspects of database management systems.

Course Outcomes:
Upon successful completion of the course, the student should be able to:
1. Explain the basic concepts of data modeling, database systems, entity-relationship model, relational data model, and relational database design.
2. Design and model the real-world database systems from the given requirements specifications using the entity-relationship model/relational model and learn to convert the ER model into a relational schema.
3. Describe the fundamentals of SQL and formulate SQL queries on data for data definition, manipulation, retrieval, and analysis.
4. Justify the relevance of the normalization of databases and discuss the implementation techniques of database management systems.

Unit 1: Introduction
File Systems and Database; Components of Database Management Systems, Advantages of DBMS; Database Management Models: Relational, Network, Hierarchical, Object Oriented.

Unit 2: Data Modelling
Entity-Relationship Data Model, Normalization and its significance and different levels of normalization, Physical Database Design, Integrity Constraints, database security and disaster recovery strategies.

Unit 4: Querying RDBMS
Structured Query Language (Data Definition, Data Manipulation, Data Control), Aggregate Functions, Nested Sub Queries, Views.

Unit 5: Data base Design and Transaction Processing
Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (up to BCNF). ACID properties, Concurrency control.

Text Books:
- Silberschatz, A., Korth, H. F., & Sudarshan, S. (2019). Database system concepts (7th ed.). McGraw Hill Education.
- Elmasri, R., & Navathe, S. B. (2016). Fundamentals of database systems (7th Global ed.). Pearson Education.
- Ramakrishnan, R., & Gehrke, J. (2014). Database management systems (3rd ed.). McGraw Hill.

Reference Books:
- Connolly, T., & Begg, C. (2013). Database systems: A practical approach to design, implementation and management (6th ed.). Pearson.
- Sumathi, S., & Esakkirajan, S. (2007). Fundamentals of relational database management systems. Springer.

SECOND SEMESTER

Business Research Methods

Course Objective:
1. To introduce the fundamental concepts and significance of business research.
2. To equip students with the ability to critically evaluate and select appropriate sampling methodologies and data collection instruments suitable for specific business research objectives and contexts.
3. To conduct statistical analysis using a range of univariate, bivariate, and multivariate techniques to effectively test research hypotheses in business settings.
4. To enable students to apply specific analytical techniques such as chi-square tests, discriminant analysis, and conjoint analysis for addressing relevant business research questions.
5. To understand the process of designing comprehensive business research projects, interpreting the resulting data and analyses.

Course Outcomes:
Upon successful completion of the course, the student should be able to:
1. Discuss the meaning and role of business research, formulate research problems and hypotheses, and apply appropriate research designs and quantitative analysis methods for various business scenarios.
2. Select and apply suitable sampling methods and data collection tools for business research.
3. Conduct statistical analysis using univariate, bivariate, and multivariate techniques for hypothesis testing.
4. Differentiate between parametric and non-parametric tests and apply appropriate analytical techniques including chi-square, discriminant analysis, and conjoint analysis.
5. Design and interpret business research projects and draw inferences from them to support strategic and operational decision-making.

Unit 1: **Introduction**
Introduction to business research-types of research, process of research, Formulation of the research problem, development of the research hypotheses, Types of Hypotheses.

Unit 2: **Research Design**
Definition, functions, exploratory, descriptive, experimental; Experimental research designs-pre-experimental, quasi-experimental, true experimental, statistical; Validity of research instruments-face and content, construct validity; Reliability of research instruments internal consistency procedures; Methods of data collection-primary and secondary sources; Attitudinal scales-Likert, Thurstone, Guttman scales; Questionnaire designing.

Unit 3: Sampling and Data Analysis
Concept, designs; Types of sampling designs- probability, non-probability, mixed sampling designs; sampling frame; Sample size determination; Data processing- editing, coding and tabulating; Data analysis-univariate, bivariate, multivariate; Hypothesis testing- concept, types of errors, steps in hypothesis testing.

Unit 4: Analytical Techniques
Parametric Vs Non-parametric tests, Chi-square Test, Non-parametric Tests for Normality, Runs Test, advanced data analysis techniques, discriminant analysis and Conjoint Analysis.

Unit 5: Research writing
Foundations and planning for research writing, research writing process, structure of research reports, research ethics and misconduct.

Text Books

- Malhotra, N. K., & Dash, S. (2022). Marketing research: An applied orientation (8th ed.). Pearson Education.
- Chawla, D., & Sodhi, N. (2021). Research methodology: Concepts and cases (3rd ed.). Vikas Publishing House.

Reference Books:
- Cooper, D. R., Schindler, P. S., & Sharma, J. K. (2021). Business research methods (13th ed.). McGraw Hill Education.
- Bryman, A., & Bell, E. (2022). Business research methods (6th ed.). Oxford University Press.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students (8th ed.). Pearson Education.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2018). Multivariate data analysis (8th ed.). Cengage Learning.

Marketing Management

Course Objectives
1. To introduce students to the fundamental principles of marketing, and to familiarize them with significant emerging trends
2. To explain the dynamic interplay between a company's marketing efforts and its surrounding environment.
3. To equip students with the analytical skills needed to segment markets, select appropriate target segments, and develop effective positioning strategies and value propositions.
4. To explain frameworks for analyzing and making strategic decisions related to product development, product life cycle management, branding, packaging, and various pricing strategies and tactics.
5. To evaluate different distribution channel strategies and promotional mix elements.

Course Outcomes
Upon successful completion of the course, the student should be able to:
1. Define the core marketing concepts, such as customer value, customer satisfaction, and the marketing mix, along with emerging trends like green marketing and digital marketing.
2. Explain the macro and micro environmental factors that influence marketing strategies, using tools like PEST analysis.
3. Apply market segmentation, targeting, and positioning concepts to effectively analyze and select target markets and create value propositions.
4. Analyze product and pricing decisions, including product life cycle management, branding, and pricing strategies.
5. Evaluate distribution and promotion strategies, including the use of technology in marketing channels and promotional mix, and understand the importance of marketing organization and control.

Unit 1: Introduction
Introduction to marketing function; genesis, approaches to marketing, concept of customer value, customer satisfaction and delight. Marketing mix concept, classification of goods and services; goods-service continuum. Emerging fields of marketing- green marketing, digital marketing, viral marketing, neuro marketing.

Unit 2: Marketing Environment
Analyzing needs and trends Macro Environment -Political, Economic, Socio-cultural, Legal, Ecological and Technical Environment – PEST analysis. Micro Environment – Industry & Competition.

Unit 3: Market Segmentation, Targeting and Positioning
Definition, Need & Benefits. Bases for market segmentation of consumer goods, industrial goods and services. Segment, Niche & Local Marketing, Effective segmentation criteria, Evaluating & Selecting Target Markets, Concept of Target Market and Concept of positioning – Value Proposition & USP.

Unit 4: Product and Pricing Decisions
Types of new product, new product development, managing Product Life Cycle, test marketing of a new product. Branding decisions; packaging and labeling; new trends in packaging. Pricing objectives, Factors influencing pricing decision - approaches to pricing – Price & Non-price competition, setting the price and managing the price changes.

Unit 5: Distribution and Promotion Decisions
Importance, Functions of distribution channels - introduction to the various channels of distribution, designing marketing channels. Direct Marketing, Impact of technology & Internet on distribution. Promotional Mix - Advertising, Sales Promotion, Personal Selling, Public Relations. Impact of technology & Internet on Promotion

Unit 6: Marketing Organization and Control
Concept, Types - Functional organization, Product Focused organization, Geographic Organization, Customer Based Organization, Matrix organization. Organization structure for a wide customer orientation. Need of marketing control and audit.

Text Books:
- Lamb, C. W., Hair, J. F., Sharma, D., & McDaniel, C. (2018). MKTG: A South Asian perspective. Cengage Publication.
- Kotler, P., Keller, K. L., Koshy, A., & Jha, M. (2013). Marketing management: A South Asian perspective (14th ed.). Pearson Education.

Reference Books:
- Saxena, R. (2019). Marketing management (6th ed.). McGraw Hill Education Pvt. Ltd.
- Ramaswamy, V. S., & Namakumari, S. (2018). Marketing management: Planning, implementation and control (6th ed.). Sage Publications.
- McCarthy, E. J., & Perreault, W. D., Jr. (2013). Basic marketing: A marketing strategy planning approach (19th ed.). Tata McGraw Hill.
- Etzel, M., Walker, B., Stanton, W., & Pandit, A. (2009). Marketing management (14th ed.). Tata McGrawHill.
- Stanton, W. J. (2007). Fundamentals of marketing (14th ed.). McGraw Hill.

Operations and Supply Chain Management

Course Objectives:
1. To introduce and explain the core functions of operations management and illustrate the critical interdependencies between supply chain management and other key business functions within an organization.
2. To explain operational challenges related to strategic product and process design and selection decisions.
3. To describe the fundamental principles and concepts of inventory control and warehouse management, emphasizing their importance in efficient operations.
4. To demonstrate the basic methodologies of demand forecasting.
5. To explain the foundational elements of quality management principles.

Course Outcomes:

Upon successful completion of the course, the student should be able to:

1. Discuss functions of operations management, and interaction between supply chain management with other business functions.
2. Analyse operations issues related to product and process selections.
3. Discuss the fundamentals of inventory and warehouse management
4. Conduct demand forecasting using basic time series and regression analysis
5. Discuss the fundamental aspects of quality management and supply chain management

Unit 1: Introduction

Introduction to Production Management- role, scope and interface with marketing, finance, strategy; Introduction to Supply Chain Management, Types of production systems, Concepts of productivity. Demand forecasting, Time Series, Regression Analysis and Qualitative techniques, Concept of Strategic fit, Classification of SCs

Unit 2: Product Design and Process Selection

Product Design and Process Selection, Service Design, Outsourcing, Value Engineering, QFD, Concurrent Engineering, Facility Planning- location, layout

Unit 3: Inventory Management

Inventory management in Deterministic and uncertain environment, Classification of Inventory, Material Requirements Planning (MRP).

Unit 4: Supply and Warehouse Management

Vendor selection, rating, Supply management, Inbound logistics, Warehouse management, JIT, Distribution requirements planning (DRP)

Unit 5: Quality and Distribution Management

Total Quality Management (TQM), Six-sigma, ISO 9000, MIS, Distribution management, Outbound logistics, Channels of distribution.

Unit 6: Supply Chains Restructuring

Flexibility and Agility in SC, Mass Customization, Supply Chain restructuring, Smart Pricing, IT in SCM, Performance measurement of Supply Chains

Text Books:

- Jacobs, F. R., Shankar, R.& Chase, R. B. (2024). Operations and supply chain management (16th ed.). McGraw Hill Education
- Chopra, S. (2021). Supply chain management: Strategy, planning, and operation (7th ed.). Pearson Education.
- Charry, S. N. (2005). Production and operation management- Concepts, methods & strategy. John Wiley & Sons Asia Pvt. Limited.
- Adam, E., Jr., & Ebert, R. (1998). Production and operation management.

Reference Books:

- Wisner, J. D. (2016). Operations management: A supply chain process approach. Sage Publications.
- Wisner, J. D., Tan, K.-C., & Leong, G. K. (2012). Principles of supply chain management: A balanced approach. Cengage Learning.
- Coyle, J. J., Bardi, E. J., & Longley, C. J. (2006). The management of business logistics – A supply chain perspective. Thomson Press.

MB 204- Data Warehousing &Data Mining

Course Objectives:

1. To equip students with practical skills in data exploration, preprocessing, and data warehousing.

2. To introduce the fundamental concepts, techniques, and applications of data mining.
3. To enable students to understand and apply various data mining algorithms for clustering and classification.
4. To familiarize students with the challenges and opportunities in mining complex and unstructured data, particularly text data.
5. To provide insights into current trends, research frontiers, and the societal impact of data mining.

Course Outcomes:
Upon successful completion of the course, the student should be able to:
1. Explain the core concepts of data mining, including different types of data, patterns, and applications.
2. Apply data preprocessing techniques to clean, transform, and prepare data for mining tasks, and utilize data warehousing and OLAP for data analysis.
3. Implement and evaluate various clustering algorithms to discover inherent structures and patterns in datasets.
4. Analyze the characteristics of unstructured data, particularly text, and apply text mining techniques for information extraction and classification.
5. Discuss emerging trends, research directions, and the ethical and societal implications of data mining.

Unit 1: Introduction to data mining
Why data mining? What is data mining? Kinds of data, kinds of patterns, technologies, Kinds of applications, Major issues in data mining.

Unit 2: Data exploration and preprocessing
Data objects and attribute types, basic statistical descriptions of data, data visualization, measuring data similarity & dissimilarity, Data preprocessing: Overview, data cleaning, data integration, data reduction, data transformation & data discretization.

Unit 3: Data Warehousing & Online Analytical Processing
Data Warehouse: Basic Concepts, Data warehouse modeling: Data cube & OLAP, Data warehouse design & usage, data warehouse implementation, data generalization by attribute-oriented induction.

Unit 4: Clustering: Basic concepts & Methods
Cluster Analysis, Partitioning methods, hierarchical methods, density-based methods, grid-based methods, evaluation of clustering.

Unit 5: Data Mining Trends & Research Frontiers
Mining complex data types, other methodologies of data mining, data mining applications, data mining & society, data mining trends.

Unit 6: Mining Unstructured Data: Text mining
What is unstructured data? Importance of text mining, characteristics of text mining, steps in text mining: Representation of text documents, preprocessing techniques, feature selection, constructing a vector space model, predicting and validating the text classifier.

Text Books
- Han, J., Kamber, M., Pei, J. (2011), Data Mining: Concepts & Techniques, Morgan Kauffmann, Third Edition.
- Malhotra, R. (2016), Empirical Research in Software Engineering: Concepts, Analysis & Applications, CRC press.

Reference Books
- Larose, D.T. & Larose, C.D. (2016), Data Mining and Predictive Analytics, Wiley.
- Bramer, M. (2007), Principles of Data Mining, Springer-Verlag.
- Hand D., Mannila H. and Smyth P. (2001), Principles of Data Mining, MIT Press.

- Dunham, D.H. (2006), Data Mining: Introductory and Advanced Topics, Pearson Education, First Edition.
- Pudi, V. &Radha Krishna, P. (2009), Data Mining: Concepts and Techniques, Oxford University Press.
- Dean, J. (2014), Big Data, Data Mining and Machine Learning: Value Creation for Business Leaders and Practitioners, Wiley.

Introduction to Programming using Python

Course Objectives:
1. To introduce fundamental Python programming principles, and their application in solving basic computational tasks.
2. To explain core Python data structures, including lists, tuples, sets, and dictionaries, emphasizing operations such as searching, sorting, and element modification.
3. To equip students with the skills to utilize the Python libraries for efficient data manipulation.
4. To enable students to develop object-oriented Python programs.

Course Outcomes
Upon successful completion of the course, the student should be able to:
1. Understand and apply basic Python programming concepts, including data types, operators, control statements, and loops to solve simple computational problems.
2. Manipulate strings, handle text files, and use Python modules such as os and sys to manage file operations and system-level tasks.
3. Work with Python data structures (lists, tuples, sets, and dictionaries), including performing operations like searching, sorting, and modifying elements.
4. Utilize Python libraries such as NumPy and Pandas for data manipulation, including working with arrays, DataFrames, and performing data grouping and filtering operations.
5. Develop object-oriented Python programs, applying concepts such as classes, inheritance, polymorphism, exception handling, and recursive functions.

Unit 1: Fundamentals of Python Programming

The concept of data types; identifiers, keywords, constants, variables, assignments; immutable variables; arithmetic operators and expressions; comments and error messages; conditions and logical operators; relational operators; control statements: if-else; loops (for, while).

Unit 2: Strings, Files, and System Interaction in Python

String manipulations: subscript operator, indexing, slicing a string; string functions, escape sequences; manipulating text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated); os and sys modules.

Unit 3: Python Data Structures

Python data structures and related operators: Lists, tuples, sets and dictionaries; basic list operators, replacing, inserting, removing an element; list comprehensions; searching and sorting lists; tuple operations; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries; slicing.

Unit 4: Data Analysis with NumPy, Pandas, and Matplotlib

Importing python libraries: NumPy- functions, indexing, operations; Pandas: Data Frames operations, grouping, filtering; visualization with Python using matplotlib.

Unit 5: Databases, OOP, and Functions

Using databases with Python; defining classes, objects, attributes and methods; inheritance, polymorphism, operator overloading; exception handling: try block; designing functions: arguments and return values; program structure and design; recursive functions.

Text Books
- Mckinney, W. (2017). Python for data analysis (2nd ed.). O'Reilly Media.
- VanderPlas, J. (2016). Python data science handbook: Essential tools for working with data (2nd ed.). O'Reilly Media.

Reference Books
- Guttag, J. V. (2021). Introduction to computation and programming using Python (3rd ed.). MIT Press.
- Liang, Y. D. (2013). Introduction to programming using Python. Pearson.
- Budd, T. (2010). Exploring Python (1st ed.). McGraw-Hill Education.
- Urban, M., & Murach, J. (2021). Murach's Python programming (2nd ed.). Mike Murach & Associates.