MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

MBA in Business Analytics (In-House Programme)

(New Curriculum – 2020-21)

Objective

To conduct business and industry - oriented MBA Programme in Business Analytics following AICTE Model Curriculum for Management (MBA & PGDM), 2020-21.

Course

- Two – Year full-time MBA course (Four – Semester).
- Minimum number of class room contact teaching for MBA/PGDM programme should be 96 credits (one credit equals 10 hours) and Internship / Project should be 06 credits i.e., Total 96 + 06 = 102 credits.
- Each Paper = 4 credits (40 contact hours), 6 Papers / Semester.
- Marks per paper: 100 (70-Final Semester Examination, 25- Continuous Assessments, 5-Attendance)
- **Course Structure**
- **Regular Course**

Semester	Paper	Credit	Contact Hours
I (CP)	6	24	240
II (CP)	6	24	240
III (SP)	6	24	240
Internship / Project #	1	6	60
IV (SP)	6	24	240
Course Total	25	102	1020

CP: Common Papers
SP: Specialization Papers
Internship / Project # : Project Paper + Presentation + Viva

On – Line Courses (Non-credit, Paper & Marks to be mentioned in the Mark sheet)

- Total : 4(1/Semester)
- Weightage: 4 Credits / Paper = 04 X 4 = 16 credits
- Courses (any 4): Environment Sciences, Indian Society & Culture, Indian Constitution, Entrepreneurship, English Communication, Data Mining, E-Commerce, Agri-Business, Hospitality Management, Small Business Management, Corporate Social Responsibility.

Total Credits:
Regular: 102
On-Line (Non-Credit): 16

Session

- January – June

- July – December
- Class / Day: 5 hrs / Day (5 days week)
- Project Work: after 2ndSem Examination (8 Weeks)

Examination System (Semester – Wise)

- Total Marks = 100 (70-Final Semester Examination, 25- Continuous Assessments, 5-Attendance)
- Average of four continuous assessment marks: Weightage: 25
- Semester Grade Point Average : SGPA
- Yearly Grade Point Average: YGPA
- Degree Grade Point Average : DGPA
- Project Marks (100) : Project Report (50), Presentation (30), Viva (20)
- Passmarks : 40 per paper
- Examination: 1st week of May for January to June session and 1st week of December for July to December session.

Teaching Methodology

Lecture, Discussion, Presentation, Case Studies, Group Task, Assignments, Projects, Special Lectures by industry professionals.

Internship / Project

Six to Eight weeks Internship Project in industry. Students will be required to submit a Project Report on the area of Business Analytics under the Faculty guidance. The Project will be examined on Project Report, Presentation and Viva.

General Guidelines

This MBA curriculum will be applicable from the academic year 2020 – 21. All rules and regulations regarding admission, examination, registration, migration and others shall be according to MAKAUT norms.

FIRST SEMESTER

MBA (BA) – 101	MANAGERIAL ECONOMICS (MICRO)
MBA (BA) – 102	ORGANIZATIONAL BEHAVIOUR
MBA (BA) – 103	BUSINESS COMMUNICATION
MBA (BA) – 104	LEGAL AND BUSINESS ENVIRONMENT (MICRO AND MACRO)
MBA (BA) – 105	INDIAN ETHOS AND BUSINESS ETHICS
MBA (BA) – 106	QUANTITATIVE TECHNIQUES

SECOND SEMESTER

MBA (BA) – 201	INDIAN ECONOMY AND POLICY
MBA (BA) – 202	FINANCIAL REPORTING, STATEMENTS AND ANALYSIS
MBA (BA) – 203	MARKETING MANAGEMENT
MBA (BA) – 204	OPERATIONS MANAGEMENT
MBA (BA) – 205	MANAGEMENT INFORMATION SYSTEM
MBA (BA) – 206	HUMAN RESOURCE MANAGEMENT

THIRD SEMESTER

MBA(BA) 301	MODELING TECHNIQUES
MBA(BA) 302	BUSINESS INTELLIGENCE
MBA(BA) 303	DATA SCIENCE USING R
MBA(BA) 304	STATISTICAL QUALITY CONTROL AND SIX S**IGMA**
MBA(BA) 305	LOGISTICS AND SUPPLY CHAIN ANALYTICS
MBA(BA) 306	BUSINESS FORECASTING
MBA(BA) 307	INTERNSHIP / PROJECT AND VIVA VOCE

FOURTH SEMESTER

MBA(BA) 401	DATA MODELING
MBA(BA) 402	BIG DATA TECHNOLOGY
MBA(BA) 403	DATA MINING
MBA(BA) 404	PREDICTIVE ANALYTICS
MBA(BA) 405	DATA ANALYTICS USING PYTHON
MBA(BA) 406	OPTIMIZATION ANALYTICS

FIRST SEMESTER
MBA(BA) 101: MANAGERIAL ECONOMICS (MICRO)

MODULE I

1. Introduction to Managerial Economics **[2L]**

(a) Basic problems of an economic system
(b) Goals of managerial decision making
(c) Resource allocation using PPC

2. Demand Analysis **[10L]**

A. Demand Functions - Law of Demand, Explaining the law of demand, Violations of the Law of Demand, Shifts in Demand; Elasticity of Demand: Price Elasticity (at a point and over and interval), Factors affecting price elasticity, Price elasticity and Change in Total Revenue, AR, MR and Price elasticity, Range of Values of Price Elasticity; Income Elasticity, Inferior, Superior and Normal goods, Income Elasticity and Share in Total Expenditure; Cross-Price Elasticity, Substitutes and Complements

B. Indifference curves, budget line and consumer equilibrium

C. Introduction to methods of demand estimation (concepts only)

3. Production and Cost Analysis **[14L]**

A. Production Function, Short Run and Long Run, Production with One Variable Input, Total Product, Average and Marginal Products, Law of Variable proportions, Relationship between TP, AP and MP.

B. Short Run Costs of Production, Fixed and Variable Costs, Short Run Total, Average and Marginal Cost and Relationship between them, Short Run Cost Curves, Relationship between AVC, MC, AP and MP; Long run cost curves, Relationship between LAC and SAC, Economies of Scale and Scope.

C. Production with Two Variable Inputs, Isoquants – Characteristics, Marginal Rate of Technical Substitution, Laws of Returns to Scale, Isocost Curves, * # Finding the Optimal Combination of Inputs, Production of a given output at Minimum Cost, Production of Maximum Output with a given level of Cost, Expansion Path, Finding the Long Run Cost Schedules from the Production Function,

D. Law of supply, elasticity of supply, market equilibrium, changes in equilibrium.

MODULE II

4. Alternate Goals of Managerial Firms **[2L]**

(A) Profit maximization
(B) Revenue maximization
(C) Managerial utility maximization

5. Managerial Decision Making under Alternative Market Structures **[6L]**

A. Characteristics of Perfect Competition, #Profit Maximization in Competitive Markets, Output Decision in the Short Run, Shut Down Point, Short Run Supply for the Firm and Industry; Output Decision in the Long Run, Break Even Point, Long Run Supply for the Perfectly Competitive Industry

B. Price and output decision under different market structure – Monopoly, Monopolistic Competition, Oligopoly – cartel, price leadership.

6. Pricing Decisions **[6L]**

A. Price Discrimination under Monopoly, Transfer Pricing.

B. Market Failure

C. Game theory &Asymmetric information

Suggested Readings:

1. Damodaran, Suma – Managerial Economics – Oxford University Press.
2. Lipsey & Chrystal – Economics – Oxford University Press.
3. Peterson & Lewis – Managerial Economics – Pearson Education.
4. Pindyck and Rubenfeld - Micro Economics – Pearson Education.
5. H.L. Ahuza- Managerial Economics, S. Chand.
6. D.N. Dwivedi- Managerial Economics, Prentice Hall.

MBA(BA) 102: ORGANIZATIONAL BEHAVIOUR

MODULE I

A. OB – Overview – Meaning of OB, Importance of OB, Field of OB, Contributing Disciplines, Applications in Industry. [2L]

B. Personality– Meaning of Personality, Determinants of Personality, Theories of Personality, Measurement of Personality, Development of Personality. [6L]

C. Perception – Process and Principles, Nature and Importance, Factors Influencing, Perception, Perceptual Selectivity, Social Perception, Fundamentals of Decision making. [4L]

D. Work Motivation – Approaches to Work Motivation, Theories of Motivation – Maslow's Hierarchy of Need Theory, Alderfer's ERG Theory, Herzberg's Motivation-Hygiene Theory, McClelland's Achievement – Motivation Theory, McGregor's Theory X & Y, Vroom's Expectancy Theory, Porter Lawler Expectancy Model. [6L]

E. Attitudes and Job Satisfaction – Sources of Attitudes, Types of Attitudes, Attitudes and Consistency, Cognitive Dissonance Theory, Attitude Surveys. [2L]

MODULE –II

F. Organization - Mission, Goals, Characteristics, Types, Organizational Theory- Classical Theories: Scientific Management, Administrative Principals, Bureaucracy, Human Relation Approach, Modern Theories: System Approach, Contingency Approach, Quantitative Approach, Behavioral Approach, Managing Organizational Culture. [6L]

G. Group Behavior - Characteristics of Group, Types of Groups, Stages of Development, Group Decision-making, difference work group and work team, Why work Teams, Work team in Organization, Team Building, Organizational Politics. [4L]

H. Leadership - Leadership Theories, Leadership Styles, Skills and influence process, Leadership and power, Examples of Effective Organizational Leadership in India, Cases on Leadership, Success stories of today's Global and Indian leaders. [4L]

I. Conflict in Organization - Sources of Conflict, Types of Conflict, Conflict Process, Johari Window, Conflict Resolution, Cases on Conflict Resolution. [2L]

J. Organizational Change - Meaning and Nature of Organizational Change, Types of Organizational Change, Forces that acts as stimulant to change. Resistance to change, How to overcome resistance to change, Approaches to managing Organizational Change, Kurt Lewin's three Step model, Action research model, Kotter's eight step model. [4L]

Suggested Readings:

1. Robbins, S.P. Judge, T.A. & Sanghi, S.: Organizational Behaviour, Pearson.
2. Luthans, Fred: Organizational Behaviour, McGraw Hill.
3. Newstrom J.W. &Devis K.: Organizational Behaviour, McGraw Hill.

4. Aswathappa ,K : Organisational Behaviour ,Himalaya Publishing House.
5. Shukla, Madhukar : Understanding Organizations – Organizational Theory & Practice in India, Prentice Hall.
6. Sekharan, Uma: Organisational Behaviour , The Mc Graw –Hill Companies.

MBA(BA) 103: BUSINESS COMMUNICATION

Module I:

1. Principles of Communication – Definition, Purposes, Types, Process, Models and Barriers. [2L]
2. Verbal and Non Verbal Communication – Presentation Skills (Planning and Preparation/ Using Visual Aids/ Delivery), Individual and Team Presentations, Public Speaking, Listening and Feedback, Body Language. [4L+6P]
3. Written Communication – Stages of Writing, Composing Business Messages, Preparing Notes, Style, Punctuation, Using simple words, Proof Reading. [4L]
4. Report Writing – Report Planning, Types of Reports, Developing an outline, Nature of Headings, Ordering of Points, Logical Sequencing, Graphs, Charts, Executive Summary, List of Illustration, Report Writing. [4L]

Module II:

5. Internal Communication – Circulars, Notices, Memos, Agenda and Minutes. [4L + 2P]
6. External Communication – Resume/CV, Using Facsimiles (Fax), Electronic Main, Handling Mail. [4L]
7. Writing Business Letters – Formats, Styles Types – Request, Enquiry, Placing Order, Instruction, Action, Complaint, Adjustment, Sales, Reference, Good News & Bad News, Acknowledgement. [2L + 4P]
8. Handling Business Information – Annual Report, House Magazine, Press Release, Press Report. [2L + 2P]

Suggested Readings:

1. Monipally: Business Communication, Tata McGraw Hill.
2. Business Communication Essentials (6th Edition) by Courtland L. Bovee & John V. Thill, Pearson.
3. Business English: A Complete Guide for All Business and Professional Communications by Prem P. Bhalla; UBS Publishers.
4. The Effective Presentation: Talk your way to success by Asha Kaul; SAGE.
5. Madhukar: Business Communications; Vikas Publishing House.
6. Senguin J: Business Communication; Allied Publishers.

MBA(BA) 104: LEGAL AND BUSINESS ENVIRONMENT (MICRO & MACRO)

Module I: Legal Environment

1. Legal Aspects of Business - Society, State and Law, Enforceability of Law, Mercantile Law. [2L]

2. Indian Contract Act, 1872 – Contract defined, Elements of valid contract, Classification of contracts, Offer and acceptance, Consideration, Capacity to contracts, Free consent, Legality of object and consideration, Illegal agreements, Termination of contracts, Breach of contract, Indemnity and guarantee, Laws of agency. [6L]

3. Sale of Goods Act, 1930 – Classification of goods, Conditions & Warranties, Passing of ownership rights, Rights of an unpaid seller, Remedies for breach of Contract of Sale of Goods. [4L]

4. Negotiable Instruments Act, 1881 – Definition and characteristics of different types of negotiable instruments, Parties to a negotiable instrument and their capacity, Dishonour of cheques, Discharge from Liability, Crossing of cheques, Bank drafts and Banker's cheques. [4L]

5. Companies Act, 1956 – Nature and kinds of companies, Formation, Memorandum, Articles, Prospectus, Capital – shares, debentures, borrowing powers, minimum subscription, Appointment of Directors; Winding up of companies (Including Amendments). [6L]

6. Consumer Protection Act, 1986 – Salient features and objectives of the Consumer Protection Act, 1986, Different Consumer redressal Forums, Composition and jurisdiction of district, state and National forum, Mode of complaints, Procedures for disposal of complaints, Penalty. [4L]

7. Intellectual Property Right- Laws relating to Patents (Patent Act, 1970), Trademarks (Trademark Act, 1999), Copyright (Copyright Act, 1957), Geographical Indications (Registration & Protection) Act, 1999. [4L]

Module II: Business Environment

8. Economic Indicators – Consumer Price Index, Interest Rate, Inflation Rate and its impact on Business, Business Risk. [4L]

9. Intellectual Property Regime (WTO Guidelines). [2L]

10. Legislation for Anti competitive and Unfair Trade Practice – Objectives of MRTP Act, 1969, Objectives of Competition Act, 2002, Monopolistic Trade Practice, Anti competitive Agreement, MRTP vs Competition Act. [4L]

Suggested Readings:

1. Sen & Mitra: Commercial law; World Press 2. Pathak: Legal Aspect of Business, TMH.
3. Das & Ghosh: Business Regulatory Framework: Ocean Publication, Delhi.
4. Pillai & Bagavathi: Business law, S. Chand.
5. Dutt & Sundaram: Economic Environment of Business, S. Chand.
6. Misra, S. K & Puri, D. K.: Economic Environment of Business, Himalaya Publishing.

MBA(BA) 105: INDIAN ETHOS AND BUSINESS ETHICS

Module – I: Indian Ethos

1. History & Relevance; Principles, practiced by Indian Companies; Role of Indian Ethos (Management lessons from Vedas, Mahabharata, Bible, Quran, Arthashastra,) Indian Heritage in Business. Ethics Vs Ethos, Indian Vs Western Management; Work ethos and values for Indian Managers. [6L]

2. Relevance of Value-based Management in Global change- - impact of Values on stake holders; Trans-cultural human values; Secular - Vs Spiritual values; value system in work culture. [4L]

3. Stress Management, - meditation for mental health, yoga. [2L]

4. Contemporary Approaches to Leadership – Joint Hindu Family business; Leadership qualities of Karta. [2L]

5. Indian systems of learning- Gurukul system of learning, advantages – disadvantages of Karma, Importance of Karma to managers , Nishkama Karma- laws of Karma ; Law of creation- Law of humility- Law of growth – Law of Responsibility- Law of connection – Corporate Karma Leadership. [6L]

Module - II: Business Ethics

6. Understanding Business Ethics – Ethical Values, Myths and Ambiguity, Ethical Codes, Ethical Principles in Business; Theories of Ethics, Absolutism vs. Relativism. [6L]

7. Approaches to Business Ethics: Teleological Approach, The Deontological Approach, Kohlberg's Six Stages Of Moral Development (CMD). [4L]

8. Managing Ethical Dilemma: Characteristics, Ethical Decision Making, Ethical Reasoning, The Dilemma Resolution Process; Ethical Dilemmas In Different Business Areas Of Finance, Marketing, HRM and International Business. [4L]

9. Ethical Culture in Organizations – Developing Code of Culture in Organization, Ethical and Value-Based Leadership. Role of Scriptures in Understanding Ethics, Ethics in Business, Strategies of Organizational Culture Building, Ethical Indian Wisdom and Indian Approaches towards Business Ethics. [6L]

Suggested Readings

1. Beteille, Andre - Society and Politics in India, OUP.
2. Chakraborty, S. K. - Values and Ethics for Organisations, OUP.
3. Fernando, A.C. - Business Ethics - An Indian Perspective, Pearson.
4. Gupta, Dipankar - Social Stratificaiton, OUP.
5. Srinivas, M. N.- Social Structure and Caste and Other Essays, OUP.
6. Sandhya, N- Indian Society, Vrindya Publication.

MBA(BA) 106: QUANTITATIVE TECHNIQUES

Module I:

1.Linear Programming: Formulating maximization/minimization problems, Graphical solution, Simplex method, Artificial Variables – Big M – Method, Special cases of LP, Duality of LP and its interpretation, Post Optimality/Sensitivity Analysis, Applications of LP. [6L]

2. Transportation Problems: Introduction - Mathematical formulation of transportation problem - the Transportation method for finding initial solutions-North West Corner Method - Least Cost Method - Vogel's Approximation method - test for optimality - steps of MODI method-loops in transportation table - Degeneracy. [6L]

3. Assignment Problems: Introduction - Mathematical statement of the problem-Hungarian method of solution - Maximization case in assignment problem—unbalanced assignment problem - restrictions on assignment - Travelling salesman problem. [4L]

4. Theory of Games: Introduction - Two person zero sum games - Pure strategies – games with saddle points - rules to determine saddle points - mixed strategies - Game without saddle points - the rules of dominance - Methods of solution for games without saddle points—algebraic methods, graphical methods. [4L]

Module II:

5. Basic Statistics: Basic Concept (Variables, Population v/s Sample, Central tendency, Dispersion, data Visualization, Simple Correlation and Regression. [4L]

6. Probability & Distribution: Probability – Introduction, Rules of Probability, Conditional Probability (Baye's Theorem), Random Variables, Discrete and Continuous Distributions (Binomial, Poisson and Normal), Sampling–Types and Distribution. [6L]

7. Theory of Estimation: Estimation – estimation problems, standard error, margin of error, confidence error, confidence interval, characteristics of estimators, consistency unbiasedness, sufficiency and efficiency, most sufficient estimators. Point Estimation and Interval Estimation. [4L]

8. Statistical Inference: Hypothesis Testing, Parametric Test – Z, F, t test, ANOVA, Non Parametric Test – Chi square test (goodness of fit, independence of attributes) Spearman's Rank Correlation Coefficient. [6L]

Software Packages to be used in illustrating the above methods

Suggested Readings

1. Statistics by Wayne L. Winston.
2. Business Statistics by GC Berry.
3. Business Statistics, Problems & Solutions by JK Sharma.
4. Operations Research by A Ravindran, Don T Philips and James J Solberg.
5. Operations Research by V K Kapoor.
6. Operations Research by S K Kalavathy.

SECOND SEMESTER
MBA(BA) 201: INDIAN ECONOMY AND POLICY

MODULE I

1.Circular Flow of Income:

National Income Accounting –terms and concepts, three methods of measuring GDP/GNP. [3L]

2. Theory of Income Determination:

Simple Keynesian model: Aggregate demand – Aggregate supply method, Savings investment method.

Concepts of multiplier: Autonomous expenditure multiplier, introducing the Government, Government expenditure multiplier, Tax Rate Multiplier, Balanced Budget Multiplier, Open economy - Export and import multipliers.

Paradox of Thrift, Crowding out effect, Business cycle – phases and stabilization. [6L]

3. Introduction of Money and Asset Market:

IS-LM model, Fiscal policy and monetary policy using IS-LM. [4L]

4. Inflation and Unemployment:

Concepts of inflation – demand pull and cost push, Stabilization policies Introduction to Philips curve as relation between inflation and unemployment. [3L]

5. Introduction to Foreign Trade & International Linkages:

Concepts of Balance of Payments, Alternative exchange rate systems – fixed, flexible and managed float, Comparative Advantage as basis for trade; Tariff and non-tariff barriers. [4L]

MODULE II

6. Indian Economy - An Overview

Evolution of Indian economy since independence, Liberalization of Indian economy since 1991. [4L]

7. New Industrial Policy

LPG model, New Industrial Policy (1991). [4L]

8. Banking and Capital Market Reforms

Banking structure in India, Composition of Indian Capital market, SEBI and Capital Market Reforms. [4L]

9. Monetary and Fiscal Policy Reforms

Composition of Indian money market, Components and Instruments of Monetary policy, Concepts and Management of Deficits. [4L]

10. Trade Policy Reforms

Major components of trade policy reforms, Idea of FEMA, NITI AYOG role and function Current and capital account convertibility. [4L]

Suggested Readings:

1. Principles of Macroeconomics - SoumyenSikdar, (OUP).
2. Managerial Economics - Suma Damodaran, (OUP).
3. Macroeconomics – Dornbusch , Fischer &Startz (PHI).
4. Economic Environment of Business: S.K. Mishra and V.K. Puri.

5. Indian Economy: Datt & Sundharam,

6. Indian Economy since Independence, Uma Kapilaed.

MBA(BA) 202: FINANCIAL REPORTING, STATEMENT AND ANALYSIS

MODULE I

1. Basic Financial Accounting Concept: Meaning and Scope of Accounting –Definition of accounting-classification of accounting- GAAP- Accounting Concepts and Conventions – Accounting Equation. [2L]

2. Preparation Of Books Of Accounts: Event-Transaction- Accounting Cycle – Golden, Rule-Journal-Ledger-Trial, Balance-Final Account. [10L]

3. Basic Cost Accounting Concept- Cost Concept-Cost Unit- Technique of Costing- Method of Costing- Cost center- Cost Unit- Cost Sheet preparation and Interpretation. [4L]

4. Introduction to Accounting Standard: Introduction to Indian GAAP and IndASIntroduction to IFRS and IAS- Comparative Analysis of Indian GAAP and IndAS. [4L]

MODULE II

5. Preparation Of Financial Statement: Trading Account-Profit & Loss Account -Balance Sheet (As per Schedule VI, old & new) with Adjustment Entries - Preparation and Interpretation of Annual Report -Corporate Social Responsibility – Human Resource Accounting-Value Added Statement. [10L]

6. Financial Statement Analysis: Comparative Statement- Common Size Statement- Trend Analysis- Ratio Analysis-Fund Flow Statement - Cash Flow Statement. [10L]

Suggested Readings:

1. M. Hanif & A. Mukherjee : Financial Accounting. McGraw Hill.
2. S. K. Paul: Financial Accounting, New Central book Agency.
3. S. P. Jain & K. L. Narang: Cost and Management Accounting. Kalyani Publication.
4. P. M. Rao: Financial Statement Analysis and Reporting. PHI.
5. T. P. Ghosh, N. Ankarnath, K. J. Mehta & Y. A. Alkafazi: Understanding IFRS Fundamentals, Wiley.
6. Tulsian & Tulsian: Corporate Financial Reporting, S. Chand.

MBA(BA) 203: MARKETING MANAGEMENT

MODULE I

1. Introduction: Definitions of marketing; Core Concept of Marketing – need, want, demand, offering and branding, value and satisfaction, Evolution of marketing concepts (orientations); Marketing Mix – 4Ps and 4Cs. [2L]

2. Marketing Environment: Major components of Internal Environment, the microenvironment and macro-environment; SWOT Analysis, PEST Analysis. [2L]

3. Strategy and Planning: Concept of SBU, Choice of Corporate level Strategy; BCG matrix, Product-Market Grid, Porter's Five Force Model for Industry Analysis. [4L]

4. Market Segmentation, Targeting and Positioning (STP): Concepts of market segmentation: Various bases for segmentation: Geographic, Demographic, Psychographic (VALS-II) and Behavioural; Targeting: Mass marketing, Segment Marketing, Niche Marketing, Micro Marketing and Customization; Concept of Differentiation and Positioning. [4L]

5. Consumer Behaviour and Marketing Research: A framework of consumer decision making process, overview of major factors influencing consumer behavior; marketing research: Role in decision making, Steps and process of Marketing Research, B2B Marketing. [4L]

MODULE II

6. Product: Product Classification, Service – characteristics and expanded service mix elements; Product Levels, Product Mix, Product Line Management, Product Life Cycle: concept and types, New Product Development. [6L]

7. Branding and Packaging: Purpose of branding; Brand equity; Branding strategies; Purpose of Packaging; Types of Packaging – primary, secondary, shipping packages. [3L]

8. Pricing: Procedure for price setting; Pricing objectives; Cost and Demand consideration; Pricing Methods, Pricing Strategies. [3L]

9. Marketing Channels: Channel flows and functions; Channel design decisions; Wholesaling and Retailing, Concept of Supply Chain Management and Logistics Management, Channel Conflict Management. [5L]

10. Promotion: Elements of Promotion Mix (Advertising, Sales Promotion, Personal Selling, Direct Marketing, Publicity & PR), 5M model of Advertising, Concept of Digital Marketing; Overview of Selling Process. [5L]

11. Basic concepts of market potential: Sales potential/ Market Share and Sales forecast; Methods of Sales forecasting. [2L]

Suggested Reading:

1. Kotler, P., Keller, K., Koshy, A. & Jha, M. - Marketing Management; Pearson.
2. Ramaswamy & Namakumari - Marketing Management; McMillan.
3. Saxena, R. - Marketing Management; TMH.
4. Kurtz, David L, Boone , Louis E - Principles of Marketing; Thomson.
5. Keith Blois – Text Book of Marketing; Oxford University Press.
6. Etzel, M.J., Walker, B.W. & W.J. Stanton - Marketing; TMH.

MBA(BA) 204: OPERATIONS MANAGEMENT

MODULE I

1. Introduction to Production and Operations Management: Difference between Manufacturing and Service Operations; Product Process Matrix capacity planning-Responsibilities of Production Manager; Production as a Coordination Function; Production Cycle, Production Planning & Control Concept. [4L]

2. Characteristics of Manufacturing Systems: Classification of Manufacturing Systems with Examples; Differences between Intermittent and Continuous Production. [2L]

3. Plant Location: Need for a Good Plant Location; Factors influencing Plant Location – Tangible and Intangible Factors; Economic Survey of Site Selection. [2L]

4. Plant Layout: Need for a Good Plant Layout; Characteristics of a Good Layout; Costs associated with Plant Layout; Process Layout vs. Product Layout; Optimization in a Process Layout and Product Layout; Designing Product and Process Layout; Assembly Line Balancing – Concept and Problems; Cellular Manufacturing Concept. [6L]

5. Maintenance Management: Types of Maintenance – Breakdown and Preventive Maintenance; Total Productive Maintenance (TPM). [3L]

MODULE II

6. Purchase Management: Purchasing Procedure; Value Analysis; Vendor Selection; Negotiation; Make or Buy decision. [2L]

7. Inventory Management: Classification of inventory items – ABC, FSN, VED classification; Introduction to EOQ and EBQ; MRP – Concept, inputs and outputs, benefits, examples; Deterministic demand model–EOQ- Continuous and Periodic review Inventory models; Master Production Schedule and MRP; Concepts of MRP II, JIT and ERP. [6L]

8. Inspection & Quality Control: Types of Inspection; Statistical Quality Control –Acceptance Sampling and Control Charts. [5L]

9. Scheduling: Sequencing – Definition and Assumptions; Sequencing of n jobs on a single machine – Shortest Processing Time, Longest Processing Time, Earliest Due Date and First Come First Serve basis; Sequencing of 2 jobs on 2 machines – Gantt Charts, Limitations of Gantt Charts; Sequencing of n jobs on 2 and 3 machines – Johnson's Rule; Introduction to Project Management – CPM and PERT, Identification and Importance of the Critical Path. [6L]

10. Work Study: Definition and its Importance; Basic Procedure in Performing a Work Study; Method Study –Objectives and Procedure; Work Measurement–Objectives and Procedure; Concepts of Performance Rating, Basic Time, Allowances and Standard Time. [4L]

Suggested Readings:

1. Chary, S.N. – Production and Operations Management; TMH.
2. Panneerselvam, R. – Production and Operations Management, PHI.
3. Bedi, K. – Production and Operations Management; Oxford University Press.
4. Chase, Jacobs, Aquilano and Agarwal – Operations Management for Competitive Advantage; TMH.
5. Buffa, E. S. and Sarin, R.K. – Modern Production / Operations Management; John Wiley.
6. Collier, Evans and Ganguly – Operations Management; Cengage Learning.

MBA(BA) 205: MANAGEMENT INFORMATION SYSTEM

MODULE I

1. **E-commerce / E-business** [3L]

Overview, Definitions, Advantages & Disadvantages of E-commerce Business models of e-commerce: models based on transaction party (B2B, B2C, B2G, C2B, C2C, E-Governance), models based on revenue models Implementation ecommerce business, online and offline marketing.

2. ERP, CRM, SCM [10L]

ERP (Enterprise Resource Planning):

Concepts of ERP, architecture of ERP, Generic modules of ERP, Applications of ERP, concept of XRP (extended ERP), Features of commercial software like SAP, Oracle Apps, MS Dynamics NAV.

CRM (Customer Relationship Management):

Concepts of CRM, Features, application of CRM Sales force automation.

SCM (Supply Chain Management):

Concepts of SCM, drivers of SCM, inbound & outbound.

Definition, brief description and applicability of: eProcurement, eTailing, eLogistics, eCollaboration, eIntegration.

Case studies for ERP, CRM, and SCM.

3. Data Communication & Networking [4L]

Need for computer networking, components of a data communication system, Network topology

Types of networks: LAN, MAN, WAN; concepts of Internet, Intranet, Extranet, and WWW.

Network protocols, Network Architecture.

MODULE II

4. Threats to Computer Systems and Control Measures [2L]

Concepts of threats: Virus, hacking, phishing, spyware, spam, physical threats (fire, flood, earthquake, vandalism).

Concepts of security measures: firewall, encryption.

5. Database Management Systems (DBMS) [e.g. MS-Access/ Oracle/ MS SQL Server / MySQL etc.] [4L+2P]

What is a DBMS; Need for using DBMS. Concepts of tables, records, attributes, keys, integrity constraints

SQL: DDL & DML, DCL concepts, SQL commands [ANSI standard].

6. Data Warehousing and Data Mining. [3L]

Concepts of Data warehousing, data mart, meta data, multidimensional modeling, Online Analytical Processing (OLAP), Online Transaction Processing (OLTP), Data mining concepts, knowledge discovery v. data mining, data mining applications.

7. MS Office Applications. [12P]

MS Excel: Graphs and Charts–Calculation of various financial functions Performing Mathematical Calculations (using Formula and Functions), Searching, Sorting and Filtering, Min Media Mode, Reference Operators, Functions: Typing a Function, Creating a Column Chart: Changing the Size and Position of a Chart Saving.

MS Access: Tables and Queries, Forms, Relationship.

MS Power Point: Introduction–Toolbar, their Icons and Commands– Navigating in Power point-Creation of slides, animation, and templates-Designing Presentations– Slide show controls–

Making notes on Pages and Handouts–Printing Presentations– Customizing Presentations-Auto content Wizard.

Suggested Readings:

1. Waman S Jawadekar: Management Information Systems – Text and Cases 3ed, McGraw Hill.
2. Mahadeo Jaiswal & Monica Mittal: Management Information Systems, OUP.
3. Forouzan: Data Communication & Networking, TMH.
4. Tanenbaum: Computer Networks, Pearson Education.
5. Ivan Bayross: SQL & PL/SQL, BPB ISRD, Introduction to Database Management Systems, Tata McGraw Hill.
6. Sadagopan: ERP: A Managerial Perspective, Tata McGraw Hill.

MBA(BA) 206: HUMAN RESOURCE MANAGEMENT

MODULE I

1. Human Resource Management: Meaning, Scope, objectives, and functions of HRM, HR as a Factor of Competitive Advantage, Structure of HR Department, Line and staff responsibility of HR Managers, Environmental factors influencing HRM. [2L]

2. Human Resource Planning: definition, objective, process of HRP. Supply and Demand Forecasting techniques, Manpower Inventory, Career Planning& Development, Succession Planning, Rightsizing, Restructuring. Human Resource Information System (HRIS). [6L]

3. Recruitment and Selection: Process, Sources, Methods of selection, Interviewing Methods, Skills and Errors. [4L]

4. Human Resource Development: Definition, objective, process of HRD, Assessment of HRD Needs, HRD Methods: Training and Non-Training, Training Process; Designing, Implementation and Evaluation of Training Programmes, Induction Training. Developing Managerial Skills for: team management, collaboration, interaction across business functions, presentation, Negotiation, and Networking. [6L]

5. Performance Appraisal Systems : Purpose, Methods, Appraisal instruments, 360 degree Appraisal, HR Score Card, Errors in appraisal, Potential Appraisal, Appraisal Interview. [4L]

MODULE II

6. Compensation Management : Concepts, Components; System of Wage Payment, job evaluation, wage/ salary fixation, incentives, bonus, ESOPs, Fringe Benefits, Retirement Benefits. Compensation Plans. [4L]

7. Industrial Relations in India: Parties; Management and Trade Unions, Industrial Disputes: Trends, Collective Bargaining, Settlement Machineries, Role of Government, Labour Policy in India. [4L]

8. Workers' Participation in Management: Concept, Practices and Prospects in India, Quality Circles and other Small Group Activities. [2L]

9. Discipline Management: Misconduct, Disciplinary action, Domestic Enquiry, Grievance Handling. [4L]

10. Strategic HRM: Meaning, Strategic HRM vs Traditional HRM, SHRM Process, barriers to SHRM. Nature of e-HRM, eRecruitment & Selection, e-Performance Management, e-Learning. [4L]

Suggested Readings:

1. Agarwala T. - Strategic Human Resource Management, OUP.
2. Aswathappa, K. - Human Resource Management, Tata McGraw Hill.
3. Jyothi P. & Venkatesh, D.N. - Human Resource Management, OUP.
4. Ramaswamy, E.A. - Managing Human Resources, OUP.
5. Saiyadain, M.S - Human Resource Management : Tata McGraw Hill.
6. Mondal Sabari & Goswami Amal - Human Resource Management: Vrinda Publications.

THIRD SEMESTER
MBA(BA) 301: MODELING TECHNIQUES

MODULE I:

1. Introduction to Data Modeling: Data Model Concept, Goals, Stages of Modeling, Applications of different types of data models, Importance of data modeling in business. [4L]

2. Data Preprocessing: Data types, Quality, Descriptive data summarization – central tendency and dispersion measure, Data cleaning, Outlier detection, Data integration & transform, Data reduction. [4L]

3. Non Parametric test: Goodness of Fit, Test of independence, Wilcoxon Sign rank test, Mann-Whitney-U test, K-S test. [6L]

4. Classification & Prediction: Decision Tree, Bayesian classification, Discriminant Analysis, Prediction – Linear Regression. [6L]

MODULE II:

5. **Linear Modeling:** Theory of linear estimation, Gauss Markov linear models (concepts only), least square estimators, estimation of error variance, properties of least square estimators. [4L]
6. **ANOVA & DOE:** One way & two way classifications, Types of Experimental Designs. [6L]
7. **Elements of Decision Theory:** Decision making under certainty, uncertainty and risks. Concepts of Decision Modeling. [6L]
8. **Simulation Modeling Applications:** Monte Carlo simulation, using random numbers, Applications in inventory analysis, Waiting lines, Maintenance and finance areas. [4L]

Suggested Readings:

1. David Levine, Mark Berenson and Timothy C. Krehbiel: Basic Business Statistics.
2. Jacquelyn G Blac: Business Statistics: Contemporary Decision making.
3. Amir Aczel: Complete Business Statistics.
4. Hoberman Steve: Data Modeling Master Class Training Manual.
5. William W. Gregory & William W. Gregory: The Data Modeling Handbook: A Best–Practice Approach to Building Quality Data Models.
6. Adrienne Watt: Database Design – 2nd Edition.

MBA(BA) 302: BUSINESS INTELLIGENCE

MODULE I:

1. **Introduction, Essentials and Types of Business Intelligence (BI):** Definition, History and Evolution, BI Segments, Difference between Information and Intelligence, Defining BI Value Chain, Factors of BI System, Real time BI, BI Applications, Creating BI Environment, BI Landscape, Types of BI, BI Platform, Dynamic roles in BI, Roles of BI in Modern Business- Challenges of BI, Multiplicity of BI Tools, Types of BI Tools, Modern BI, the Enterprise BI, Information Workers. [8L]
2. **Architecting the Data and Data Warehousing:** Types of Data, Enterprise Data Model, Enterprise Subject Area Model, Enterprise Conceptual Model, Enterprise Conceptual Entity Model, Granularity of the Data, Data Reporting and Query Tools, Data Partitioning, Metadata, Total Data Quality Management (TDQM), Data Warehousing, Advantages and Disadvantages of Data Warehousing, Data Mart, Aspects of Data Mart, Online Analytical Processing , Characteristics of OLAP, OLAP Tools, OLAP Data Modeling, OLAP Tools and the Internet, Difference between OLAP and OLTP, Multidimensional Data Model, Data Modeling using Star Schema and Snowflake Schema. [8L]
3. **Different Ways of Data Warehousing and Knowledge Management:** Types of Business Models, B2B Business Intelligence Model, Electronic Data Interchange & E-Commerce Models, Advantages of E-Commerce for B2B Businesses, Systems for Improving B2B E-Commerce, B2C Business Intelligence Model, Need of B2C model in Data warehousing, Different types of B2B intelligence Models, Characteristics of Knowledge Management, Knowledge assets, Generic Knowledge Management Process, Knowledge Management Technologies, Essentials of Knowledge Management Process. [6L]

MODULE II:

4. **Data Extraction and Business Intelligence Life Cycle:** Data Extraction, Role of ETL process, Importance of source identification, Various data extraction techniques, Logical extraction methods, Physical extraction methods, Change data capture, Business Intelligence Lifecycle, Enterprise Performance Life Cycle (EPLC) Framework Elements, Life Cycle Phases, Human Factors in BI Implementation, BI Strategy, Objectives and Deliverables, Transformation Roadmap, Building a transformation roadmap, BI Development Stages and Steps, Parallel Development Tracks, BI Framework. [6L]
5. **Business Intelligence User Model and Implementation:** Evolution of BI, BI Opportunity Analysis Overview, Content Management System, End User

Segmentation, Basic Reporting and Querying, Online Analytical Processing, OLAP Techniques, OLAP Applications, Applying the OLAP to Data Warehousing, Benefits of using OLAP, Dashboard, Advanced/Emerging BI Technologies, Business Intelligence Platform, Business Intelligence Platform Capability Matrix, BI Target Databases, Data Mart, BI Products and Vendor, The Big Four BI vendors, Future of BI. [6L]

6. **Business Intelligence Issues, Challenges, Strategy and Road Map:** Critical Challenges for BI success, Cross-Organizational Partnership, Business Sponsors, Dedicated Business Representation, Availability of Skilled Team Members, BI Application Development methodology, Planning the BI Projects, Business Analysis and Data Standardization, affect of Dirty Data on Business profitability, Importance of Meta-Data, Silver Bullet Syndrome, Customer Pain Points, Creating Cost Effective Enterprise friendly BI solution, Planning to implement a BI Solution, Understand Limitations of BI, BI Usage, How to make the best use of BI?, The Advantages of BI with Sales, How can BI be used for the rescue?, Organization Culture, Managing Total Cost of Ownership for BI, Total Cost of Ownership and BI, Managing the TCO of the BI, Factors that Affect Total Cost of Ownership. [6L]

Suggested Readings:

1. "Successful Business Intelligence, Second Edition: Unlock The Value Of BI & Big Data" by Cindi Howson.
2. "Business Intelligence Roadmap: The Complete Project Lifecycle For Decision-Support Applications" by Larissa T. Moss & Shaku Atre.
3. "Business Intelligence Guidebook: From Data Integration To Analytics" by Rick Sherman.
4. "The Data Warehouse Toolkit: The Definitive Guide To Dimensional Modeling" by Ralph Kimball & Margy Ross.
5. "Internet-Enabled Business Intelligence" by William A. Giovinazzo.
6. "The Data Warehouse Toolkit: The Definitive Guide To Dimensional Modeling" by Ralph Kimball & Margy Ross.

MBA(BA) 303: BUSINESS FORECASTING

MODULE I:

1. **Historical perspective of Business Forecasting:** Concept of Business forecasting, Difference among Econometrics, Mathematics and Statistics, Importance of Econometrics, Linkage of Econometrics with Business Forecasting-Types of Data. [6L]
2. **Regression Model:** Steps, Linear, Non linear. [4L]
3. **Univariate time series:** Linear model, Stationarity, Seasonality, Trend, Elimination of seasonality, Autocorrelation, Partial Auto correlation, Multicollinearity, ARIMA, ARMA process, Difference between AR& MA models. [10L]

MODULE II:

4. **Stationarity and Unit Roots Tests:** Introduction, Unit Roots tests (the Dickey-Fuller test, the augmented Dickey-Fuller test (ADF), or the Phillips-Perron test (PP)), Stationarity tests (KPSS Test). [4L]
5. **Univariate Time Series:** Volatility Models-Introduction, The ARCH Model, The GARCH Model. [6L]
6. **Multivariate Time Series Analysis:** Vector Auto regression Model–Co integration. [4L]
7. **Introduction to E Views:** E views Functions, Programming in E views. [2L]
8. **Introduction to R studios:** Programming in R for time series forecasting. [2L]
9. **Case Study**. [2L]

Suggested Readings:

1. Damodar N. Gujarati, Basic Econometrics, McGraw-Hill Publication, 2003.
2. Chris Chatfield, The Analysis of Time Series: An Introduction, Chapman and Hall.
3. N. H. Chan, Time Series: Applications to Finance, John Wiley and Sons.
4. James D. Hamilton, Time Series Analysis, Princeton University Press.
5. Terence C. Mills, The Econometrics of Financial Time Series Cambridge University Press.
6. Box, Jenkins, Reinsel, Ljung, Time Series Analysis: Forecasting and Control; Wiley Publications.

MBA(BA) 304: DATA SCIENCE USING R

MODULE I:

1. **Programming in R:** Basics of R, Conditional and loops, R packages/libraries, Data mining GUI in R, Data structures in R, Exceptions/ debugging in R. [4L]

2. **Data Wrangling:** Reading CSV, JSON, XML, .XLSX and HTML files using R, ETL operations in R, Sorting/ merging data in R, Cleaning data, Data management using dplyr in R. [4L]

3. **Modeling in R:** Linear regression model in R, Multiple linear regressions model, Representation of regression results, Non Linear Regression. [10L]

MODULE II:

4. **Mining Algorithms using R:** Association analysis, Market-based analysis/ rules, Apriori algorithm, Segmentation analysis- types of segmentation, k-means clustering, Bayesian clustering, Principal Component Analysis (PCA). [10L]

5. **Time Series Forecasting in R and model deployment:** Basics of time series, Components of time series, Time series forecasting, Deploying predictive models. [10L]

6. **Case Study**. [2L]

Suggested Readings:

1. R for Data Science – Hadley Wickham and Garrett Grolemund.
2. R in Action – Robert Kabacoff.
3. R for Everyone: Advanced Analytics and Graphics – Jared P. Lander.
4. The R Book – Michael J. Crawley.
5. R and Data Mining: Examples and Case Studies – Yanchang Zhao.
6. Data Analytics using R - Seema Acharya, Mc Graw Hill Publication.

MBA(BA) 305: STATISTICAL QUALITY CONTROL AND SIX SIGMA

MODULE I:

1. Introduction to control charts, process and product control, control charts, sigma control limits, tools for statistical quality control, creating control charts for variable. [8L]
2. Construction of control charts for attributes, p-chart for fraction defective, d-chart for number of defective, interpretation of p-chart. Control charts for number of defects per unit, limits for c-chart, c-chart for variable sample size or u-chart, application c-chart and Natural tolerance limits and specification limits. [8L]
3. Acceptance sampling by attributes- acceptance quality level, lot tolerance proportion or percent defective, process average fraction defective, consumers risk, producers risk, rectifying inspection plans, average outgoing quality limit, O.C curve, single sampling plan, double sampling plan and sequential sampling plan. [8L]

MODULE II:

4. Six sigma- Basics of six sigma, traditional approach of six sigma, break through approach to six sigma-measure, variation, cost of quality, six sigma measurements, Analyze, improve control: challenges in implementing six sigma. [8L]
5. Elements of six sigma business score card: Leadership and profitability, Management and improvement, Employees and innovation, Purchasing and supplier management, Operational execution, Sales and distribution, Service and growth, Six sigma business score card and measurements, Business performance index, Corporate DPU and DPMO, Corporate sigma level. [8L]

Suggested Readings:

1. S.C.Gupta and V.K. Kapoor, Fundamentals of Applied Statistics, Sultan and Chand, New Delhi, 2017.
2. Praveen Gupta, Six Sigma Business Scorecard, Tata McGraw-Hill Publishing company limited, New Delhi, 2017.
3. Gupta and Kapoor, Fundamentals of applied statistics, Sultan and Chand, 2017.
4. Pathak and F. Resh, Demographic Methods, Sultan and Chand, 2017.
5. G. Harver, Lean Six Sigma For Beginners, A Quick-Start Beginner's Guide To Lean Six Sigma, Kindle Edition.
6. Daniel J. Zrymiak, Govindarajan Ramu, Roderick A. Munro, The Certified Six Sigma Green Belt Handbook, 2nd Edition (With 2 CD-ROMs) Hardcover –2015.

MBA(BA) 306: LOGISTICS AND SUPPLY CHAIN ANALYTICS

MODULE I:

1. Introduction to Supply Chain Analytics: SCOR (Supply Chain Operations Reference), Definition, Relevance, Significance and scope of Supply Chain Analytics. [8L]
2. Overview of Supply Chain Models and Modeling Systems: Descriptive models, Optimization modes, Off-the shelf modeling system (SLIM). [8L]
3. Application of Supply Chain Models – I:A Calibration Model Establishes Position and Performance Gap, Logistics Models, from Manufacturing to Accepted Delivery, Models for Forecasting, Demand Management, and Capacity Planning, Models for Order Management and Inventory Management, DRP I & II, Procurement and Sourcing Techniques. [8L]

MODULE II:

4. Application of Supply Chain Models – II: Models for Sales and Operations Planning, Advanced Planning and Scheduling Models, Models for Supplier Relationship Management. [8L]
5. Application of Supply Chain Models – III: Models for Customer Relationship Management, Models for Collaborative Design and Manufacturing, Collaborative Planning, Forecasting, and Replenishment Models, Strategy for Effective Customer Service, Models for Logistics. [8L]

Suggested Readings:

1. Jeremy Shapiro (2010), Modeling the Supply Chain, California: Brooks/ Cole Publishing - Cengage Learning.
2. Muthu Mathirajan et al., (2016), Analytics in Operations/Supply Chain Management, New Delhi: IK International Publishing House.
3. Feigin (2011), Supply Chain Planning and Analytics, New York: Business Expert Press.
4. Nada R Sanders (2014), Big Data Driven Supply Chain Management: A Framework for Implementing Analytics and Turning Information Into Intelligence, New Jersy: Pearson FT Press.
5. Marshall L Fisher, Ananth Raman (2010), The new science of retailing: how analytics are transforming the supply chain and improving performance, Harvard Business Review Press.
6. Hokey Min (2016), Global business analytics models: concepts and applications in predictive, healthcare, supply chain, and finance analytics, Pearson.

FOURTH SEMESTER

MBA(BA) 401: DATA MODELING

MODULE I:

1. **Data Modeling Concepts:** Definition, Requirements of data modeling, Different data modeling tools, Other alternatives title of a data modeler, Role and responsibilities of a data modeler, IDEF1X and IE methodology. [3L]
2. **Data Modeling Types and Standard:** Logical, physical, dimensional, conceptual and enterprise data model, Data modeling development life cycle, Naming standards of objects, Abbreviating column names, Consistency in column names and importance. [3L]
3. **Data Warehouse and OLAP:** Data Warehouse and DBMS, Multidimensional data model, OLAP operations. [2L]
4. **Database Explanation from Data Modeling Perspective:** Main object (Table, Column, Data Type), Constraints (NULL, NOT NULL, Primary Key, Unique, Check and Default Value), Other Objects (Database, Schema, Tablespace, Segment, Extent, Privileges, Index, View, Synonym), DDL and DML statements. [6L]
5. **Creating Logical Data Model:** Entity, Attribute, Primary and alternative key, Inversion key entry, Rule, Relationship, Definition, Index, Unique index. [4L]

MODULE II:

6. **Relationships:** Identifying, non-identifying and many to many, Cardinality, Different types of relationships (One to one, one to many, many to one and many to many relationships), Self-referential integrity relationship, Normalization process (1NF, 2NF, 3NF), Supertypes and subtypes. [4L]
7. **Creating a Physical Data Model:** Table, Column, Different key constraints, Default value, Unique and non-unique index, Difference between a logical and physical data model. [4L]
8. **Physical Data Model, Database and Scripts:** Forward and Reverse Engineering, Generating scripts from a data model, comparing database and data model, Implementing physical data model in a database, Generating SQL code and implementing on a database. [6L]
9. **Repository, Meta data and Maintenance of the data model:** Repository, Meta data, Maintaining of the data model and work in a multi-user environment, Dimensional data modeling (Causal, Junk, Outrigger, Degenerate). [8L]

Suggested Readings:

1. Patterns of Data Modeling by Michael R. Blaha.
2. The Enterprise Data Model: A framework for enterprise data architecture, 2nd edition by Andy Graham.
3. Data Modeling Theory and Practice by Graeme Simsion.

4. The Data Model Resource Book: Volume 3: Universal Patterns for Data Modeling by Len Silverston.
5. Data Modeling Essentials by Graeme Simsion, Graham Witt**,** Morgan Kaufmann Publishers.
6. Beginning Relational Data Modeling by Sharon Allen, Apress.

MBA(BA) 402: BIG DATA TECHNOLOGY

MODULE I:

1. **Overview of Big Data:** History of big data, elements of big data, career related knowledge in big data, advantages, disadvantages, structured and unstructured data. [6L]

2. **Using Big Data in Businesses:** Use of Big Data in Marketing, Finance, HR, Production and Supply Chain Management. [8L]

3. **Technologies for Handling Big Data:** Introduction to Hadoop, functioning of Hadoop, Cloud computing (features, advantages, applications), Application Data store (NOSQL, OLAP. [6L]

MODULE II:

4. **Understanding Hadoop Ecosystem:** Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive: Hive Shell, Hive Services, Hive Meta store, Comparison with Traditional Databases, Hive QL, Tables, Querying Data and User Defined Functions. Hbase: HBasics, Concepts, Clients, Example, Hbase versus RDBMS. Big SQL: Introduction. [8L]

5. **Hadoop Distributed File System:** The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume, Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures. [6L]

6. **NoSQL Data Management:** NoSQL including document databases, Graph Database, Schema less database, CAP Theorem. [4L]

7. **Case Studies.** [2L]

Suggested Readings:

1. Zomaya and Sakr: Handbook of Big Data Technology.
2. Sumit Gupta: Real time Big Data Analytics Book.
3. E. Siegel: Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die.
4. A. Maheshwari: Data Analytics Made Accessible.
5. J. W. Foreman: Data Smart: Using Data Science to Transform Information into Insight.
6. V. Mayer-Schönberger and K. Cukier: Big Data: A Revolution That Will Transform How We Live, Work, and Think.

MBA(BA) 403: PREDICTIVE ANALYTICS

MODULE I:

1. **Probability and Analysis of Variance:** Law of total probability, Conditional probability, Bayes' theorem and applications. Discrete and continuous random variable, Testing equality of population means (One–Way & Two–Way Classification). [8L]
2. **Multiple Correlation Analysis:** Introduction, Significance of multiple correlation, Multiple and partial correlation, Relation between multiple and partial correlation coefficients. [4L]
3. **Multiple Regression Analysis:** Introduction, Significance of Multiple Regression Analysis, Estimating the parameters of Multiple Regression by method of Least Squares and Using Regression Coefficient methods, Relation between partial regression coefficients and correlation coefficients, Standard Error of Estimates for Multiple regression. [6L]

MODULE II:

4. **Measures of Central Tendency:** Measures of dispersion, Range, Quartile deviation, Mean deviation, Standard deviation, Coefficient of variation, Moments, Absolute moments, Factorial moments, Skewness, Kurtosis, Sheppard's corrections. [6L]
5. **Forecasting Trend:** Introduction, Linear trend model, Exponential trend, Measurement of Seasonal effects – Method of Simple Average, Ratio-to-Trend Method, Ratio-to-Moving Average Method, Link Relative Method. [4L]
6. **Hypothesis testing:** Estimation and sampling techniques, Sample mean, Sample variance, t, Chi-square and F tests of significance based on them, Small sample tests. [10L]
7. **Case Studies.** [2L]

Suggested Readings:

1. Srivatsava TN, Shailaja Rego: Statistics for Management, Tata McGraw Hill.

2. Anand Sharma, Statistics for Management, Himalaya Publishing House.

3. Amir D.Aczel, Jayavel Sounderpandian (2015), Complete Business Statistics, New Delhi:Tata McGrawHill.

4. S.P. Gupta &M.P. Gupta (2015), Business Statistics, New Delhi: Sultan Chand & Sons.

5. Goon-Gupta-Dasgupta: Outline of Statistics 1 and 2, The World Press.

6. Gupta and Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons.

MBA(BA) 404: DATA MINING & VISUALIZATION

MODULE I:

1. **Introduction to Data Mining:** Data mining, Related technologies – Machine Learning, DBMS, OLAP, Statistics, Data Mining Goals, Stages of the Data Mining Process, Data Mining Techniques, Knowledge Representation Methods, Applications. [4L]
2. **Data Preprocessing:** Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies, Installing Weka 3 Data Mining System. [4L]
3. **Data Mining Knowledge Representation:** Task relevant data, Background knowledge, Interestingness measures, Representing input data and output knowledge. Visualization techniques. [4L]
4. **Data Visualization Softwares:** Experiments with Weka- visualization, Tableau, Microsoft Power BI. [5L]
5. **Attribute-Oriented Analysis:** Attribute generalization, Attribute relevance, Class comparison, Statistical measures, Model Performance Measures. [4L]

MODULE II:

6. **Data Mining Algorithms I:** Association rules, Motivation and terminology, Generating item sets and rules efficiently, Correlation analysis. [4L]
7. **Data Mining Algorithms II:** Classification, Basic learning/mining tasks, Inferring rudimentary rules: 1R algorithm, Decision trees (CHAID), Random Forest, Covering rules. [6L]
8. **Data Mining Algorithms III:** Prediction, The prediction task, Bayesian classification, Bayesian networks, Instance-based methods (nearest neighbor), Linear Models. [4L]
9. **Clustering:** Basic issues in clustering, conceptual clustering system, Partitioning methods: k-means, expectation maximization (EM), Hierarchical methods: distance based agglomerative and divisible clustering, Conceptual clustering: Cobweb. [5L]

Suggested Readings:

1. Hand D., Mannila H. and Smyth P.: Principles of Data Mining, MIT Press, 2001.
2. Langley P.: Elements of machine learning, Morgan Kaufmann Publishers, 1996.
3. Larose D.T.: Discovering knowledge in data: an introduction to data mining, Wiley-Interscience, 2005.
4. Witten, I.H., Frank, E., Hall, M.A., Pal, C.J.,: Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publishers, 2016.

5. Powell B.: Mastering Microsoft Power BI: Expert techniques for effective data analytics and business intelligence, Packt (Paperback), 2018.

6. Zhang, J.: Tableau 10.0 Best Practices, Packt (Paperback), 2016.

MBA(BA) 405: DATA ANALYTICS USING PYTHON

MODULE I:

1. **Python Basics:** Python variables, expressions, statements Variables, Keywords, Operators & operands, Expressions, Statements, Order of operations, String operations, Comments, Keyboard input. [4L]

2. **Conditions & Iterations:** Conditions, Modulus operator, Boolean expression, Logical operators, if, if else, if-elif-else, Nested conditions, Iteration - while, for, break, continue, Nested loop. [4L]

3. **Functions:** Type conversion function, Math functions, Composition of functions, defining own function, parameters, arguments, Importing functions. [4L]

4. **Recursion:** Python recursion, Examples of recursive functions, Recursion error, Advantages & disadvantages of recursion.

Strings: Strings Accessing values in string, Updating strings, Slicing strings, String methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(), isnumeric(), isspace(), isupper() max(), min(), replace(), split().

List: Introduction, Traversal, operations, Slice, Methods, Delete element, Difference between lists and strings, Example program, Dictionaries - idea of dictionaries.

Tuples: Idea of lists & tuples, Brief idea of dictionaries & tuples. [8L]

MODULE II:

5. **Object-Oriented Programming with Python:** Concepts, Creating class, Instance objects, Accessing attributes, built in class attributes, destroying objects, Inheritance, Overloading, Overriding, Data hiding. [4L]

6. **Python Exceptions:** Exception handling, except clause, User Defined Exceptions Regular expression- Match function, Search function, Matching VS Searching, Modifiers, Patterns. [4L]

7. **File Operations in Python:** create, open, read, write, append, close files; Stack and Queue, Stacks and Queues using lists. [4L]

8. **NumPy, SciPy, SymPy:** basic concepts.

Pandas: Object creation, Viewing data, Selection, Missing data, Operations, Merge, Grouping, Reshaping, Time series, Categoricals, Plotting, Getting data in/out from CSV, Excel. [6L]

9. **Case Studies.** [2L]

Suggested Readings:

1. Python Programming by Anurag Gupta, G Biswas – Mcgraw Hill Education.
2. Learn Python The Hard Way by Zed A. Shaw, ADDISON-WESLEY.
3. Learning Python by Mark Lutz, O'REILY.
4. Programming In Python by Dr. Pooja Sharma, BPB.
5. Python Programming - Using Problem Solving Approach by Reema Thareja, OUP.
6. Fundamentals of Python by Kenneth A Lambert, New Delhi: Cengage Learning.

MBA(BA) 406: Optimization Analytics

MODULE I:

1. **Linear programming:** Managerial Applications of Optimization & Limitations, Formulation of LP models, Formulation of LP models, Formulating maximization/minimization problems, Graphical solution, simplex methods, Special cases of LP, Duality of LP and its interpretation, Dual simplex methods, Post Optimality/sensitivity analysis, Applications of LP. [10L]
2. **Markov Analysis:** Brand switching analysis, Prediction of market shares for future periods, Equilibrium conditions, Uses of Markov analysis. [6L]
3. **Transportation & Assignment Problems:** VAM method, checking for optimally using MODI method, unbalanced problem and degeneracy, Hungarian method for assignment problem, Traveling salesman problem. [4L]

MODULE II:

4. **Game Theory:** Concept of saddle point, Pure & Mixed Strategy, Graphical Method, Dominance Property. [4L]
5. **Replacement Models and Sensitivity Analysis:** Types of replacement problems, Replacement of assets that deteriorate with time, Understanding of sensitivity model and observe the behavior, Measurement of sensitivity analysis, Methods of sensitivity analysis, Using sensitivity analysis for decision making. [6L]
6. **Network Analysis:** PERT & CPM – Project scheduling by PERT/CPM – Cost considerations in PERT/CPM. [8L]
7. **Case Studies.** [2L]

Suggested Readings:

1. J. K. Sharma, "Operations Research Theory and Application", Macmillan Publishers, 4th Ed, 2009.
2. Hamdy A Taha, "Operations Research", Pearson. 9th Ed, 2010.
3. S.S. Rao, "Engineering Optimization: Theory and Practice", New Age International Pvt. Ltd., New Delhi, 2000.
4. G.V. Shenoy, U.K. Srivastava, S.C. Sharma, "Operations Research for Management", New Age International, Revised 2nd Ed, 2005.
5. Edwin K. P. Chong, Stanislaw H. Zak, "An Introduction to Optimization", Wiley, 2001.
6. Xin-She Yang, "Optimization Techniques and Applications with Examples," Wiley, 2018.