KLEF CENTRE FOR DISTANCE & ONLINE EDUCATION

MBA PROGRAM STRUCTURE & SYLLABUS

MBA (Data Science)

S.No	Semester	Course Name	L	T	P	S	CR
SEMESTER I							
1	22DS5101O	Essentials of Management	3	0	0	0	3
2	22MB51C0O	Quantitative Methods	3	0	0	0	3
3	22MB51C2O	Business Economics	3	0	0	0	3
4	22MB51C3O	Financial & Management Accounting	2	1	0	0	3
5	22MB52C2O	Business Research Methodology	4	0	0	0	4
6	22DS5102O	Introduction to Python Programming	3	0	2	0	4
SEMESTER II							
7	22DS5203O	Foundation in Data Base Management Systems	3	0	0	0	3
8	22DS5204O	Management Science	3	0	0	0	3
9	22MB52C3O	Human Resource Management	3	0	0	0	3
10	22DS5205O	Excel for Data Science	2	0	2	0	3
11	22DS5206O	Data Visualization using Tableau	2	0	2	0	3
12	22MB51C4O	Marketing Management	3	0	0	0	3
13	22DS52E1O	Live Project	0	0	16	0	8
SEMESTER III							
14	22DS6107O	Advanced Business Analytics Using R & Python	3	0	2	0	4
15	22DS6108O	Econometrics with Business Applications Using R/Gretl/Eviews	3	0	2	0	4
16	22DS6109O	Machine Learning Using Python	3	0	2	0	4
17	22DS6110O	Advanced Excel for Data Science	3	0	2	0	4
18	22DS6111O/ 22DS6112O/ 22DS6113O	Elective I - Marketing Analytics –I /Financial Analytics –I /People Analytics –I	3	0	2	0	4
19	22DS61E2O	Mini Project	0	0	16	0	8
SEMESTER IV							
22	22DS6214O	Natural Language Processing -NLP	3	0	2	0	4
23	22DS6215O	Big Data Analysis	3	0	2	0	4
24	22DS6216O	Deep Learning Using Python	3	0	2	0	4
25	22DS6217O	Advanced SQL for Data Science	3	0	2	0	4
26	22DS6218O/ 22DS6219O/ 22DS6220O	Elective II* - Marketing Analytics – II/Financial Analytics –II/ People Analytics –II	3	0	2	0	4
27	22DS62E3O	Management Research Project	0	0	16	0	8

22DS5101O: ESSENTIALS OF MANAGEMENT

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Apply the functions of Management to real-time scenarios	1	3
2	Apply the Planning function for business scenarios	5	3
3	Apply organizing & Staffing functions to corporate	5	3
4	Apply controlling to corporates to know its significance	5	3

Introduction to the functions of Management and exploring their role in the corporate world.

Syllabus:

Introduction: - Concept of Management, Scope, Functions and Principles of Management, Evolution of Management thought. 2. Planning: - The Process of Planning, Objectives, Policy and Procedures, Forecasting and Decision Making. 3. Organizing: - Meaning, Importance and Principles, Span of Management, Centralization and Decentralization, Patterns of Organization, Line and Staff Relationships. 4. Staffing: - Nature & Scope of Staffing, Manpower Planning, Selection & Training, Performance Appraisal. 5. Controlling: - Conceptor Managerial Control, Control aids, Score Responsibilities of Managers

Recommended Textbook(s):

1. Essentials of Management- by Koontz & O'Donald

Reference Book(s)

1. Management & Organizations Behaviour — by Paul Hersey & Ken Blanchard
2. Principal and Practice of Management- by L.M. Prasad
3. Human Behavior at Work — by Kaith Devis
4. Organizational Behavior — by Robbins

22MB51C0O - Quantitative Methods

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#.	Course Outcome	PO	BTL
Co1	Identify the source of a quantifiable problem, recognize the issues involved and produce an appropriate action plan.	1	3
CO2	Translate a problem into a simple mathematical model to allow easier understanding and to aid problem solving	1	3
CO3	Employ R Programming software to solve problems	1	3
CO4	Calculate and interpret numerous statistical values and appreciate their value to the business Manager.	6	3

Syllabus:

Probability and Sampling: Definitions and rules for probability, conditional probability independence of events, Bayes' theorem, and random variables. Probability distributions: Binomial, Poisson and Normal distributions. Introduction to R Programming. Sampling: Introduction to sampling, Basic Concepts, Types of Sampling. Sampling distributions, sampling distribution of mean and proportion, application of Central Limit Theorem. Determining the sample size. Estimation: Point and Interval estimates for population parameters of large sample and small samples. Hypothesis testing: one simple and two sample tests for means and proportions of large samples (z-test), one sample and two sample tests for means of small samples (t-lest), F-test for two sample standard deviations. ANOVA one- and two-way, Chi-square test for single sample standard deviation, Chi-square tests for independence of attributes and goodness of fit. Sign test and Rank Test. Correlation and Regression: Meaning, Types of Correlation, measurement: graphic and algebraic, Scatter Plot, Pearson Correlation Coefficient, Rank Correlation: Spearman's Rank Correlation. Testing the significance of the correlation coefficient. Regression: Meaning, Types, Estimating the regression coefficients, Testing the significance of regression coefficients, Index Numbers and Time Series Analysis: Time series analysis: Meaning and Components of Time Series, Variations in time series, Smoothing Methods: trend analysis, cyclical variations, seasonal variations and irregular variations. Index Numbers: Unweight and Weighted Index numbers.

Recommended Textbook(s):

1. Levin R.I. and Rubin D.S., Statistics for Management. 8thedn. Pearson Education.
2. Amir D Aczel and jayavel Sounder Pandian: Complete Business Statistic, 7e, McGraw Hill

Reference Book(s):

1. Anderson, Sweeny, Williams: Statistics for Business and Economics, 9e
2. Venables, W.N; Introduction to R Programming, CRAN

22MB51C2O – Business Economics

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#.	Course Outcome	PO	BTL
1	Apply the intuition for analyzing economic problems from a Managerial perspective in an organizational &business context. use the basic tools that structure the microeconomic problems for optimal decision-making.	3,4	3
2	Analyze the theory of demand, forecast and estimation of demand for managerial decision-making.	3	4
3	Analyze different types of competition in the existing external Environment.	4	4
4	Analyze the Macro Economic Environment of the Organization	4	4

Syllabus:

Introduction: Economics and managerial decision making; Managerial Economics, nature and scope of Managerial Economics; Tools of Managerial Economics; Risk, Uncertainty and Probability Analysis. Optimization techniques: Firm Theory: Objectives of the firm; Theory of the growth of the firm: Marris and Penrose; Role of a Managerial Economist. Demand and Advertisement Analysis: Concept of demand; Determinants of demand, Law of Demand; Elasticity of demand; Demand estimation and demand forecasting, Demand forecasting for consumer durables and capital goods. Techniques of demand forecasting. Advertising– Contribution of Economic Theory: Methods of determining Total advertising budget; Cyclical Fluctuations of Advertising, Measuring the Economic Effects of Advertising. Production and Cost Analysis: Production functions, Long Run and Short Run Production Functions, The Cobb- Douglas Production function, Optimum input combination; Cost concepts, Short- run and Long- run cost functions, Cost curves, Economies of Scale; Introduction to pricing and pricing practices. Market analysis: Markets, Kinds of Competition; Features of different types of market structures, Price & Output determination under Perfect competition, Monopoly, Monopolistic competition, Oligopoly; Monopoly Policy –MRTP, Macroeconomic concepts: National Income, Measurement of National Income, Uses of National Income Statistics; Business Cycles, Stages of business cycles; Inflation, Types of Inflation, Impact of inflation, Measures to overcome Inflation.

Textbook(s):

1. Dominick Salvatore, Managerial Economics, Oxford publications, 2007.

Reference Book(s):

1. H.L. Ahuja, Managerial Economics, McGraw Hill, 2008.
2. Paul G. Keat, Philip K.Y.Young and Sreejata Banerjee, Managerial Economics, Pearson education, 2009.
3. P.L. Mehta, Managerial Economics, S.Chand & Sons, New Delhi, 2007.
4. D.N. Dwivedi**,** Managerial Economics, Vikas Publications, New Delhi-2007.
5. G.S.Gupta, Macro Economics – Theory and Applications, The McGraw – Hill Companies, 2008

22MB51C3O – Financial and Management Accounting

L-T-P-S: 2-1-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	To understand the accounting process in business.	1	2
2	To gain a knowledge on application of concepts and principles in preparing	6	2
3	To evaluate the tactical decisions of middle level managers relating to cost and management accounting	1	5
4	To analyze the financial statements and evaluate the decisions for better investment.	6	4

Financial accounting, journal, ledger, ratio analysis, formats, marginal costing.

Syllabus:

Financial Accounting: Bookkeeping – Users of Accounting information – Classification of Accounting – Accounting concepts and conventions – Accounting standards and GAAP – Double entry system – Journal – Ledger. Trial Balance – Subsidiary Books – Cash Book. Trading and Profit & Loss Account - Balance Sheet with Adjustments (Problems) - Methods of Depreciation. - Ratio Analysis (problems); Issue of shares (entries) Companies Financial Accounts as per schedule 6 part I & Part II. Formats: Banking Accounts, Insurance Accounts and Electricity Accounts. Marginal Costing (Problems) – Break-even Analysis (Problems).

Recommended Textbook(s):

1. Libby, Financial Accounting, 6e Tata McGraw Hill, Delhi.

Reference Book(s)

1. Horngren,HarrisonJr.Oliver, “Financial & Management Accounting by PHI

2. Colin “Drury, Cost & Management Accounting” by Cengage Publishing
3. Horngren,HarrisonJr.Oliver, “Financial & Management Accounting by PHI
4. S N Maheshwari, “Accounting for Management”, Vikas Publishing House, 2009

22MB52C2O – Business Research Methodology

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Apply Research Process to Business Problems	1	3
2	Apply scaling techniques in developing a questionnaire	5	3
3	Analyze the data using Exploratory Data Analysis Tools -EDA	7	4
4	Analyze organizational data using software packages like R	7	4

Introduction to Scientific research, thinking like a Researcher, Scaling of attitudes, Types of data, introduction to SPSS & R, Descriptive data analysis, and report writing.

Syllabus:

Introduction to Scientific Research: Science and Scientific Research –History of Scientific Research- Types of Scientific Research – Research process – Defining Research Problem and Development of Research Hypothesis –Review of Literature: role and methods- Research design – Types – Ethical issues in Social Research. Thinking like a Researcher: Unit of study- Study population- Concepts and Variables; Propositions, Hypotheses and Theories-Levels of measurement of variables: Scaling of attitudes. Reliability and validity of scales. Data Collection, Processing and Analysis: Plan for data collection; Census Vs Sampling- Sampling Design -Sample size determination; Types of data; Primary Vs Secondary Data – Primary Data: media used to communicate with respondents: Questionnaire, Interviews, Observation-Selection of an appropriate survey research design – Data Processing Editing, Coding, Classification and Tabulation of data- Introduction to SPSS & R. Explorative Data analysis: Graphs and Diagrammatic presentation of data: Descriptive data analysis: Univariate and Bivariate Data Analysis-Confirmative Data Analysis – Stating hypothesis and hypothesis testing Report Writing: steps in report writing, Mechanics of report writing, precautions in research reporting.

Recommended Textbook(s):

1. William G. Zikmund: Business Research Methods, 8th edition, 2010, Cengage Learning.

Reference Book(s)

1. Alan Bryman and Emma Bell: 'Business Research Methods, Third Edition, 2011, OUP.
2. Donald R. Cooper, Pamela S. Schindler: Business Research Methods, 8/e, TMH, 2009.
3. C.R Kothari: Research Methodology: Methods & Techniques, 2/e, Vishwa Prakashan, 2009.
4. Moser and Kalton: Survey Methods in Social Investigation, Second edition, ELBS.
5. Gaur: Statistical Methods for Practice and Research, Sage Publication,2009.
6. Dipak Kumar. Bhattacharya: Research Methodology, Excel Books, 2009)
7. R for Everyone–Advanced Analytics and Graphics by Jared P. Lander, Pearson Edu., 2015.

22DS5102O Introduction to Python Programming

L-T-P-S: 2-0-2-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Apply the basics of python on simple datasets	1	3
2	Apply the operators and develop simple functions in python	1	3
3	Apply NumPy Arrays for data for Indexing and Slicing	5	3
4	Apply advanced packages to understand their usage of data in analysis and visualization.	5	4
5	Analyze the business data to understand the application of Python packages.	7	4

Introduction to Python programming, travelling through NumPy, Pandas and Matplotlib along with Seaborn to understand the strength of Python in data science.

Syllabus:

Introduction to Python programming: Need for programming, Programming languages, History of Python, Python Installation, Interactive modes, keywords, variables, Identifiers, data

types –Numbers, sequences, Sets, Mappings and None, mutable vs Immutable data types,

Operators in Python - Arithmetic, Assignment, Relational, Logical, Identity and Membership Operators, Expressions, Precedence of operators in python, Type Conversion – Implicit and Explicit, Functions in Python, Simple Programs on If, If else, Nested If and for loops.

Introduction to NumPy: NumPy Array, Operations on Arrays, Indexing and Slicing; **Introduction to Pandas:** Series and Data frames – simple examples;
Introduction to Data visualization: Matplotlib – Usage of Pyplot, Pyplot functions with examples and Seaborn with simple examples.

Recommended Textbook(s):

1. Python for Everybody by Charles R Severance, 2016
2. Data Analysis from Scratch with Python by Peters Morgan, AI Sciences LLC, 2016

Reference Book(s)

1. Fundamentals of Python by Kenneth A lambert, 2014, Cengage Learning PTR.
2. Fundamentals of Python Programming by Richard L Halter man, 2019
3. Python 3.7.0 Tutorial by Guido Van Rossum
4. Python 3 Tutorial by tutorialspoint.com

22DS5203O – Foundation in Data Base Management Systems

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Understanding the Database Management Systems (DBMS)	1	2
2	Examine the DBMS models and relational DBMS	1	4
3	Examine how to create different “keys” concepts in the DBMS	3	4
4	Understanding different data types and commands to retrieve data	7	2

Understanding the DBMS, DBMS models, and RDBMS; how to create different “keys” in the DBMS and data types along with commands.

Syllabus:

CO1: DBMS: Introduction to Database Management System, DBMS Architecture, Advantages, Data Models: Entity-Relational Model, Relational Model, Keys-Primary, Secondary super key, Foreign Key, composite key, natural key, artificial key, candidate key;

CO2: Normalization and its forms- Anomalies-Insert, delete, update; Dependencies-Functional, Transitive, Multi-valued and Partial Dependency, Normal Forms-1NF,2NF,3NF,3.5NF,4NF,5NF,6NF.

CO3: SQL: Introduction, Data Types, Operators, Expressions, Data Definition Language (DDL)-CREATE, INSERT, Data Manipulation Language (DML) – ALTER (Modify, Rename, drop), UPDATE, DELETE, Data Query Language (DQL)- SELECT, Data Control Language (DCL)-GRANT, REVOKE, Arithmetic Operations in SQL, Other commands -JOINS, ORDER BY, GROUP BY; Introduction to PL/SQL, No SQL, PostgreSql.

CO4: Manipulations on Database: Installing XAMPP server, loading python (Jupyter), Connecting database thru python, Performing SQL commands using python, Basic Understanding programs in PL/SQL.

Reference Book(s):

1. Fundamentals of Database Systems,6th Edition by Elmasri and Navathe.
2. Learning SQL, Second Edition, by Alan Beaulieu,2009, Published by O'Reilly Media, Inc.
3. Python Data Science Handbook, by Jake Vander Plas, Published in 2017.
4. Python3 from tutorial point.

22DS5204O –**Management Science**

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** Nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Understanding the management science concepts and decision-making in the organization	1	2
2	Evaluating quantitative analysis and linear programming	6	5
3	Evaluating different distribution and network models and their applications	6	5
4	Applying inventory models and understanding their specific applications in the real-time business scenario	6	3, 2
5	Applying simulation models and evaluating their real-time applications	6	3, 5

Understanding the management science concepts, decision-making, evaluating quantitative analysis, linear programming, distribution and network models, inventory models, and simulation models

Syllabus:

CO1

Introduction to Management Science. Problem-Solving and Decision-Making, Quantitative Analysis, Models of Cost, Revenue and Profit, a Simple Maximization Problem; Graphical Solution; Extreme Points and the Optimal Solution, A Simple Minimization Problem; Sensitivity Analysis, and Integer Linear Programming.

CO2

Distribution and Network Models, Transportation Models, Assignment Models, Minimum Cost Network Flow Models, Shortest Path Models, **Nonlinear Optimisation Models**, Basic Ideas of Nonlinear Optimization, Pricing Models, Advertising Response and Selection Models, A Production Application, Facility Location Models, Markowitz Portfolio Optimization Models.

CO3

Inventory Models, Economic Order Quantity Model, Economic Production Lot Size Model, Single-Period Inventory Model with Probabilistic Demand, Order-Quantity, Reorder Point Model with Probabilistic Demand. **Project Scheduling: PERT/CPM**, Project Scheduling with Known Activity Times Project Scheduling with Unknown Activity Times Time-Cost Trade-Offs.

CO4

Simulation Modelling, Real Applications of Simulation, Probability Distributions for Input Variables, The Effects of Input Distributions on Results, Operations Models, Financial Models, Simulating Games of Chance, Decision Trees, and Dynamic Programming.

Recommended Textbook(s):

1. An Introduction to Management Science, 13th Edition, South-Western (August 18, 2010), by Anderson, Sweeney, Williams, Camm and Martin; (ISBN-13: 978-1-4390-4327-1; ISBN-10: 1-4390-4327-2).
2. Introduction to Management Science, Bernard W. Taylor III, Edn.11, 2013

Reference Book(s):

1. Aryasri: Management Science, McGraw Hill, 2012
2. Hamdy A. Taha- Operations Research- An Introduction; Eighth edition, Pearson Education
3. Dipak Kumar Bhattacharyya, Production and Operations Management, Universities Press, 2012
4. Balakrishnan, Render, and Stair- Managerial Decision Modelling with Spreadsheets; Pearson Education

22MB52C3O – **Human Resource Management**

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** Nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	An integrated perspective on the role of HRM in modern business	3	2
2	Competency to recruit, train, and appraise the performance of employees	5	3
3	Rational design of compensation and salary administration and ability to handle employee issues	3,5	3
4	Ability to understand and interpret emerging trends in HR	5	3

Introduction, manpower planning, HR process, Recruitment and selection, governance, Grievance, trade unionism, trends in HRM.

Syllabus:

Introduction: Importance and Functions, Scope of HRM, Human Resource Management in a changing environment; Manpower Planning: Manpower planning process, Job Description and Job specification, Job analysis and Job design, Techniques of Job design. Manpower Planning: Manpower planning process, Job Description and Job specification, Job analysis and Job design; Techniques of Job design.HR Processes: Employee Selection and Development - Recruitment, Selection and Induction, Training and Development, Performance Appraisal. Compensation Planning- Employee Compensation, Job evaluation, Employee Benefits and Welfare, Compensation and Salary Administration. Governance: Integration and Separation- Employee Discipline, Suspension, Dismissal and Retrenchment; Employee Grievance Handling, Trade Unionism, Collective Bargaining, Industrial Democracy. New Trends in HRM: HRM in India, HRM in International Firms, talent management, HR Accounting, HR Audit, HRIS

Recommended Textbook(s):

1. Dessler, Human Resource Management, Pearson Education, Eleventh edition, New Delhi, 2011.

Reference Book(s):

1. Raymond Andrew Noe, John R. Hollenbeck, Barry Gerhart, Patrick M Wright, Human Resource Management, 8th Ed., The McGraw Hill Pub, 2012
2. Louis & Gomitz Mejia et. al: Managing Human Resources, 7th Ed., Pearson Education, 2011.

22DS5206O – **Data Visualization using Tableau**

L-T-P-S: 2-0-2-0 **Credits: 3** **Prerequisite:** IPP & DVT

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Demonstrate data visualization in Tableau and experiment with other applications in it.	6	2, 3
2	Interpret data wrangling and preprocessing for the modelling	1	2
3	Interpreting and visualizing the granularity of data in different forms	1, 6	2
4	Outline the data visualization applications with real-time examples	1	2

Understanding data visualisation in Tableau and experimenting with other applications in it. Working the data wrangling concepts with the granularity of data at varied levels to visualise and model.

Syllabus:

CO1: Data Visualization Using Tableau: Significance of Tableau, Advantages of Tableau over R and Excel, Components and Applications, Installation and Usage, File and Data types, show me button (Brain of Tableau), Simple calculations.

CO2: Data Sorting- Introduction, Types of Sorting- Manual Sorting and Computer Sorting; Filters: Types of filters; Data Sources: Extracting data, editing data, Joining and Blending; Data Worksheets: Add, Rename, Save and Delete;

CO3: Chart types: Text table, Heat Map, Symbol vs Filled Map, Types of Bar chart, Area chart, Circle View, scatter plot, Gantt chart, Bullet graph; Managing Dashboards.

CO4: Data Visualization Applications: Advanced Techniques in Data Visualization, Advanced Data Visualization, Advantages Competitive tools to Tableau, Exercise on Real-time Examples.

Text Book(s):

1. Practical Tableau by Ryan Sleeper, published by O'Reilly in 2018
2. Tableau Dashboard Cook Book by Jen Stirrup, by PACKT Publishing in 2014
3. Storytelling with Data by Cole Nussbaumer Knaflicin, Wiley, 2020.
4. Data Visualization using Tableau, Tutorial Point.

22DS5205O – **Excel for Data Science**

L-T-P-S: 2-0-2-0 **Credits: 3** **Prerequisite:** Nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Understanding different data cleaning approaches and exploring roles in data science	7	2
2	Applying different operations on data and linking datasets based on a common variable	4	3
3	Create querying commands to the data in a customized form	3	6
4	Illustrate data through different visualization plots for more granularity within the data.	1	2

Syllabus:

CO1: Introduction to Data Analysis, Data Analyst vs Data Science, Working with range names, Tables, cleaning data with text values and data values

CO2: Sorting names, dates or times, rows or columns, filtering-selected values, text, date, numbers, subtotals with ranges, VLOOKUP and HLOOKUP

CO3: Quick analysis-sums, totals, average, count, pivot tables and analysis, Inferential statistics

CO4: Data visualization- charts and graphs, Financial Analysis -Capital budgeting, Working with multiple sheets.

Text Book(s):

1. Data Analysis and Business Modelling by Wayne L. Winston, PHI Learning Ltd., 2010

Reference Book(s):

1. Data Analysis using Excel from a tutorial point
2. Excel data analysis -Modelling and Simulation by Hector Guerrero

22MB51C4O – **Marketing Management**

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** Nil

Mapping of Course Outcomes with PO/PSO:

CO#.	Course Outcome	PO	BTL
1	Explain the key terms, definitions, and concepts used in the study of Marketing Management and understand the changing Marketing Environment.	PO1	2
2	Apply the knowledge of marketing concepts to strategize the marketing program regarding product and pricing	PO1, PO2	3
3	Apply the knowledge of marketing concepts to strategize the marketing program regarding promotion and distribution	PO1, PO2	3

4	Understand the need for ethics in marketing and the importance of social and green marketing	PO6	2

Overview of marketing, buyer behavior, marketing mix, pricing decisions, branding, distribution decisions, digital marketing.

Syllabus:

Overview of Marketing: Core Concepts of Marketing; Marketing Orientations & Philosophies; Marketing Environment; Buyer Behaviour; Marketing Planning Process; Consumer Value and Satisfaction; Identification and Analysis of Competitors. Market Segmentation, Targeting and Positioning strategies; Marketing Mix; The product; New Product Development; Product Life Cycle; Product Mix decisions; Branding; Packaging and Labelling. Pricing Decisions; Factors influencing Price – five "C" s; Pricing Techniques, Tactics & Strategies; Distribution Decisions; Channel alternatives; Choice of Channel; Channel Management, Channel Dynamics, Managing promotion Mix; Advertising, Personal selling, Sales Promotion and publicity, Integrated Marketing Communication Marketing Control techniques; Marketing Audit; Social Marketing; Green Marketing; Web Marketing, Digital Marketing, Viral Marketing, Neuroscience Marketing.

Recommended Textbook(s):

1. Philip Kotler - Principles of Marketing – 15th Edition, 2014, Prentice Hall, New Delhi.

Reference Book(s):

1. V. S. Ramaswamy and S. Namakumari- 3rded.Marketing Management, Prentice Hall, New Delhi.
2. Kotler and Keller, Marketing Management, 13th Edition, PHI New Delhi
3. Etzel, Walker, Stanton and Pandit, Marketing: Concepts and Cases, TMH – New Delhi
4. Philip Kotler & Gary Armstrong - Marketing Management, Prentice Hall
5. Case Studies in Marketing - Indian context - R. Srinivas, TMH, New Delhi
6. Marketing Management – Rajan Saxena, TMH, New Delhi

22DS6107O: ADVANCED BUSINESS ANALYTICS USING R & PYTHON

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite: BADM**

Mapping of Course outcomes (CO) with program outcomes (PO):

Co. No.	Course Outcomes	BTL	PO Mapping
CO1	Apply tools to understand the basics of data, data types and its cleansing.	3	PO1, PO6
CO2	Analyze the data using Univariate and bivariate tools.	4	PO1, PO6
CO3	Analyze the data using predictive analytical tools.	4	PO1, PO6
CO4	Analyze the data using Prescriptive Analytical tools	4	PO1, PO6
CO5	Analyze real-time data using all analytical tools.	4	PO1, PO6

Syllabus:

Data: Meaning and Types – Basic concepts related to data; structured, semi-structured and unstructured data - Data in organizations – Big Data – Role of Data in Decision Making – Data types by levels of measurement. Data Analysis: Meaning and Rationale - Data Preparation: cleaning, munging, normalization and transformation- Data Analysis Types – Descriptive, Explorative and Confirmative – Introduction to Univariate and Bivariate Data analysis with R, Multivariate Data Analysis-Tools- Predictive Analytics: Methods- I: Multiple Regression – Logistic Regression –Mediation and Moderation Analysis-Implementation of Methods with R. Multivariate Data Analysis. Methods-II: Factor Analysis Cluster Analysis - Implementation of Advance Methods with R- Prescriptive Analytics: Linear Programming, Integer Programming, Network Optimization, Simulation Modelling (Optional)

Reference Book(s):

1. Wes McKinney. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Python. O'Reilly Media.
2. Jake VanderPlas. Hands-On Data Science with Scikit-Learn and TensorFlow. O'Reilly Media.
3. Hadley Wickham. Advanced R. Chapman & Hall/CRC
4. Bhimasankaram Pochiraju and Chandra Sekhar Valluri. Advanced Business Analytics: Concepts, Tools, and Applications. Springer.

22DS6108O**: ECONOMETRICS WITH BUSINESS APPLICATIONS USING R/GRETL/EVIEWS**

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite:** BADM

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#	CO Description	BTL	PO Mapping
CO1	Apply the basics of Time-Series Analysis	3	PO1, PO6
CO2	Analyze the data by Applying the regression types and their application	4	PO1, PO6
CO3	Analyze the Univariate Time-Series data	4	PO1, PO6
CO4	Analyze the Multivariate Time-Series data	4	PO1, PO6
CO5	Analyze the data by applying different tools of time series.	4	PO1, PO6

Syllabus:

Introduction to Econometrics, Methodology of Econometrics, Applications of Econometrics in Business in all functional departments, Evaluation metrics for Time-Series -ME, MAE, MSE, RMSE, MAPE and MASE. Time-Series Analysis - Trend Analysis: Freehand Moving Curve Method, Semi-Averages, Moving- Averages, Least-Squares method, Exponential Smoothing-Holts, Winters, Holt-Winters methods using Excel and R. Introduction to Gretl and EViews, Ordinary Least Squares (OLS) method, Limited Dependent Variable: Logit -Binary, Ordinal and Multinomial, Probit & Tobit- Models; Univariate Time-Series: Auto Regressive Integrated Moving Average (ARIMA), Seasonal ARIMA (SARIMA) Auto-Regressive Conditional Heteroscedasticity (ARCH), Generalized ARCH (GARCH)-Standard GARCH, Exponential GARCH, AP -GARCH, GJR-GARCH, Mixed Data Sampling (MIDAS) models using relevant tools. Multivariate Time-Series: Stationarity-ADF, KPSS, Correlation-Granger Causality test, Cointegration Tests - Engle-Granger test, Johansen test, Vector Auto-Regressive (VAR), Vector Error Correction Model (VECM), Panel Regression- Fixed Effects and Random Effects, Hausman test, Assumptions. ARDL model Diagnostics (Advanced) using relevant tools.

Reference Book(s):

1. Jaffrey S Racine, Introductory Econometrics with R, Academic Press, 2019
2. Christoph Hanck, Martin Arnold, and Alexander Gerber, Econometrics with R" by (Publisher:, Year: 2018), Springer
3. Christoph Hanck, Martin Arnold, and Alexander Gerber, Introduction to Econometrics with R" by (Publisher: Springer, Year: 2021), Springer

22DS6109O: MACHINE LEARNING WITH BUSINESS APPLICATIONS (WITH R AND PYTHON)

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite:** BADM

Course Outcomes

CO#	CO Description	BTL	PO Mapping
CO1	Apply CRISP methodology to understand the flow of Machine learning process.	3	PO1, PO6
CO2	Analyze the data using Feature Engineering concepts.	4	PO1, PO6
CO3	Analyze the data using Supervised Machine learning Algorithms.	4	PO1, PO6
CO4	Analyze the data using Unsupervised Machine learning Algorithms.	4	PO1, PO6
CO5	Analyze the real-time data using any of the supervised or unsupervised ML algorithms.	4	PO1, PO6

Syllabus:

Introduction to Machine Learning: Human Learning and Machine Learning; Types of machine learning; Applications of machine learning in Business. Languages and tools in Machine Learning. Framework for Developing Machine Learning Models; Preparing to Model; Modelling and Evaluation. Brief Overview of Probability and Bayesian Statistics. Basics of Features of Feature Engineering: Feature Transformation, Feature scaling, Feature Construction and Feature Reduction. Supervised Learning: Introduction; Classification: common classification algorithms: naïve Bayes, KNN, Decision trees, Random Forest, Support Vector Machines. Regression: Common Regression Algorithms: Simple Linear Regression and Multiple Linear Regression, Polynomial Regression, Logistic Regression. Business Applications of Supervised Learning Models. Unsupervised Learning: Introduction, Unsupervised Vs Supervised Learning; Unsupervised Learning Models: Dimensionality Reduction, Clustering; Association Rule Mining. Applications of Unsupervised Learning. Basics of Neural Network. Forecasting Overview.

Reference Book(s):

1. Peters Morgan, Data Analysis from Scratch with Python, AI sciences, 2019
2. Manaranjan Pradhan and Dinesh Kuma, Machine Learning with Python, Wiley, 2019
3. Brett Lantz & Manohar Swamynadhan, Machine Learning with R, Packt Publishing, 2013

22DS6110O: ADVANCED EXCEL FOR DATA SCIENCE

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite:** Nil

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#	CO Description	BTL	PO Mapping
CO1	Apply tools to understand the basic concepts of EXCEL.	3	PO 1, PO 7
CO2	To analyse the various advanced functions of EXCEL using Data Analysis Tool Pack	4	PO 1, PO 7
CO3	To analyse the financial functions for analysing the financial performance.	4	PO 1, PO 7
CO4	Project Analysis using EXCEL Functions	4	PO 1, PO 7
CO5	To examine the implications of statistical tools in practice.	4	PO 1, PO 7

Syllabus:

Introduction to Excel: Create a workbook, enter data in a worksheet, and format a worksheet. Format numbers in a worksheet, create an Excel table, Filter data by using an Auto filter, and sort data by using an Auto filter. Essential Worksheet operations: using Help F1, Key Board shortcuts, Working with cells and ranges, Formatting cells, Name manager. Visualizing data using conditional formatting, working with date & times, creating formulae and functions creating charts and graphical representations- Advanced Excel: Lookup Functions: VLOOKUP Function, VLOOKUP Function with range lookup (True/False), HLOOKUP Function, HLOOKUP Function with range lookup (True /False), Index Function, Match Function, Pivot Tables for data analysis: Create database for pivot, analysing data with pivot tables, producing reports with pivot tables. Data Visualization: Creating Combination Charts, Discriminating series and Category Axis, Data Labels, Band Chart, Gantt Chart, Pivot Charts. GOAL Seek. Analysing data with analysis tool pack: Descriptive Statistics (AVERAGE, GEOMEAN, HARMEAN, MEDIAN, MODE, QUARTILE, STDEV, VAR, SKEW, KURT), Covariance

(COVAR), correlation(CORREL), Regression, Random Number Generation, t-test, z-test, ANOVA- Financial Functions: Present value of a series of Future Payments, Calculation of Interest Rates, Calculation of Term of Loan, Decisions on Investments, Cash flows at Beginning/Middle/Irregular Periods, Internal Rate of Return (IRR), Determining IRR of Cash Flows for a Project, Unique IRR, Multiple IRR, No IRR, Cash flows patterns on IRR, Decisions based on IRR, Modified IRR, NPV, Payback Period, Return on Future Value(FV)- Applications of Excel: Selecting the best project using Descriptive Statistics, Capital Budgeting techniques.

Reference Book(s):

1. Jacobs. K. Microsoft Office Excel 2007: The L Line, The Express Line to Learning, New York. John Wiley and Sons.
2. Stephen L Nelson and E C Nelson. Excel Data Analysis for Dummies: John. Wiley and Sons.
3. Tutorial Point. Advanced Excel Functions.
4. Tutorial Point. Data Analysis with Excel by Tutorial Point.

22DS6111O: BUSINESS ANALYTICS IN MARKETING -I

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite:** Nil

Co. No.	Course Outcome's	BTL	PO
1	To Understand the application of R for Marketing Data .	2	PO4
2	To examine the Product and Sales Performance of a firm	2	PO4
3	To Analyze the effectiveness of pricing Strategies adopted by retailers	4	PO7
4	To Analyze the impact of location, promotion strategies and other areas of Marketing	4	PO7

Syllabus:

Introduction to Business Analytics in Marketing -Introduction to Business Analytics, Business Analytics Vs Marketing Analytics, Types of Business Analytics; Recap of Marketing Concepts, Evolution of Marketing and Marketing Mix. Introduction to R, Operators in R, Basic Data types in R, Descriptive Analytics Using Marketing Data. Product and Sales Analytics, Define Product, Product Mix, Analyzing Sales of a Company (One Sample T-test), Comparing Sales of two Companies (Independent Sample T-test), Effect of Training on Sales Performance of a Company (Paired T-test), Comparing Sales Performance of more than two Companies (ANOVA-One Way), Impact of Customer demographics on the Sales of a Product (Gender,

Age, Income, Education background etc.,) for targeting. Price Analytics -What is Price? Price vs Cost, Pricing Strategies by retailers, evaluating pricing Strategies using ANOVA techniques –One Way ANOVA, Two-Way ANOVA, Repeated Measures ANOVA, Kruskal –Wallis test, along with post-hoc Tests. Place and Promotion Analytics - Significance of location, Channels of Distribution, Promotion Mix, Affect of location on the sales of a Product Using ANOVA, Impact of Adv. Cost on the Sales of a Company Using Correlation and Linear Regression Analysis. Other Areas of Marketing - Effect of Service Marketing Mix on Customer Satisfaction Using SERVQUAL scale Using Factor Analysis and Regression Models, Market Segmentation Using Cluster Analysis

Textbook(s):

1. Chapman, C., & Feit, E. M. (2015). R for Marketing Research and Analytics. Switzerland: Springer International Publishing.
2. Winston, W. L. (2014). Marketing Analytics: Data-Driven Techniques With Microsoft Excel. Indiana: John Wiley & Sons.

Reference Books:

1. Ohri, A. (2012). *R For Business Analytics.* NewYork: Springer.
2. Karunakaran, K. (2013). *Marketing Management-Texts and Cases in Indian Context*. Benguluru: Himalya Publishing House.

22DS6112O **- BUSINESS ANALYTICS IN FINANCE –I**

L-T-P-S: 3-0-2-0 Credits: 4 Prerequisite: Nil

Mapping of Course outcomes (CO) with program outcomes (PO):

Co. No.	Course Outcomes	BTL	PO
1	To analyze the time series data using R	4	PO4
2	To predict the stock market movements using Technical Analysis in R	4	PO4
3	To Evaluate the decisions by applying portfolio optimization models	5	PO7
4	To analyze the pricing of fixed-income securities using R	4	PO7

Syllabus:

Data – Types of financial data, Time Series Analysis in R: Importing stock price Data, Converting data into time series data –Decomposition of Time series data in R, Calculation of Returns in R-Daily, Weekly, Monthly & Annual, Graphing techniques, Descriptive Statistics

of Returns. Technical Analysis in R: Importing Stock Price Data, Technical Indicators like Support Resistance Levels, Momentum Indicators, Volume Indicators, and Trend Indicators. Data Analysis using R – Technical Analysis using Quant mod package in R, Portfolio Optimization in R – Mean-variance Model – Tangency Portfolio and capital Market Line-Noise in the covariance matrix Asset Pricing Models- Capital Asset Pricing Model- Arbitrage Pricing Theory- Beta Estimation-Model Testing. Fixed Income Securities in R -Measuring market risk for fixed income securities –Immunization of Fixed income Portfolio- Pricing a Convertible Bond.

Recommended Text Book (s):

1. George Daroczi, Michael Puhle, Marton Michaletzsky, ZsoltTulassay, Kata Varadi and Agnes VidovicsDancs, Introduction to R for Quantitative Finance, Packt Publishing 2013.
2. Basic econometrics by Gujarati

Reference Text Book (s):

1. Introductory econometrics for Finance by Chris Brooks 2nd Ed.

22DS6113O: PEOPLE ANALYTICS – I

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite:** Nil

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#	CO Description	BTL	PO Mapping
CO1	Apply the basic tools to understand the necessity of People Analytics and organize the data	3	PO6 & 7, PSO1
CO2	Analyse the data using Descriptive Analytics	4	PO6 & 7, PSO1
CO3	Analyse the data using Diagnostic Analytics	4	PO6 & 7, PSO1
CO4	Analyse the data using Predictive Analytics	4	PO6 & 7, PSO1
CO5	Analyse the data using suitable Analytics	4	PO6 & 7, PSO1

Syllabus:

Understanding HR analytics HR analytics defined, Migrating from Business Analytics to People Analytics, Need for mastering and utilizing predictive Human capital data storage,

Current state of HR analytics professional and academic training, HR analytics and HR people strategy, Becoming a persuasive HR function, HR information systems and data Information sources, Analysis software options, Using SPSS/R, Preparing the data and Big data-Descriptive Analytics in HR: Descriptive analytics, Statistical significance, Data integrity, Types of data, Categorical variable types, Continuous variable types, Using group/team-level or individual-level data, Dependent variables and independent variables. Statistical tests for categorical data (binary, nominal, ordinal), Statistical tests for continuous/interval-level data, Factor analysis and reliability analysis-Inferential Analytics in HR: one sample t-test, two-sample t-test and ANOVA and Chi-Square.

Case Study 1: Diversity Analytics

Case Study 2: Employee attitude surveys –engagement and workforce perceptions- Predictive Analytics in HR: Correlation, simple linear regression and multiple linear regression with assumptions

Case study 3: Predicting employee turnover

Case study 4: Predicting employee performance

Case study 5: Recruitment and selection analytics

Reference Text Book (s):

1. Martin R. Edwards. Predictive HR Analytics: Mastering the HR Metri. Kogan Page Limited
2. *David E. Caughlin.* An Introduction to Human Resource Analytics Using R. online book.
3. Jean Paul Isson and Jesse S. Harriott. People Analytics in the Era of Big Data: Changing the Way You Attract, Acquire, Develop, and Retain Talent
4. Nigel Guenole, Jonathan Ferrar, Sheri Feinzig. The Power of People-Learn How Successful Organizations Use Workforce Analytics To Improve Business Performance. FT Press.
5. David Swanson, Jenny Dearborn. he Data Driven Leader: A Powerful Approach to Delivering Measurable Business Impact Through People Analytics. Wiley.

22DS6214O: NATURAL LANGUAGE PROCESSING

L-T-P-S: 3-0-2-0 Credits: 4. **Prerequisite: Nil**

CO No:	CO	BTL	PO
1	To apply text processing to ready the data for sentimental analysis	3	PO1, PO6

2	To analyse data using Feature extraction techniques	4	PO1, PO6
3	To analyse data using Sentimental analysis approaches.	4	PO1, PO6
4	To analyse data using Topic Modelling models	4	PO 1, PO6

Syllabus:

Understanding NLP, applications, challenges, NLP pipeline and components, Text Processing-Tokenization and Segmentation, Stemming and Lemmatization, Stop words removal, Parts-of-Speech tagging, Challenges in NLP, NLP pipeline and components. Feature Extraction techniques: Popular word embedding models-Word2Vec, GloVe, and Fast Text, Bag-of-Words (BoW), N-gram models, Parts-of-Speech (POS) Tags, Dependency Parsing, Name Entity Recognition techniques; Information Retrieval - vector space models, term frequency-inverse document frequency(TF-IDF); Sentimental Analysis- Opinion Mining and Sentiment Classification (Positive/Negative), Lexicon based approaches, Machine learning based Approaches; Topic Modelling- latent Dirichlet Allocation(LDA), Probabilistic Latent Semantic Analysis (PLSA); Sequence Labelling-Hidden Markov Models, Conditional Random Fields (CRF); Text generation – Language generation models, text summarization and paraphrasing; Advanced NLP concepts- Discourse Analysis and Coherence Modelling.

Text Book(s):

1. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.

2. Anne Kao and Stephen R. Poteet (Eds), “Natural Language Processing and Text Mining”, Springer-Verlag London Limited 2007.

Reference Book(s):

1. Daniel Jura sky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd Edition, Prentice Hall, 2008.
2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin/Cummings publishing company, 1995.

3. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer Academic Publishers, 2000.

22DS6215O: BIG DATA ANALYSIS AND ITS APPLICATIONS

L-T-P-S: 3-0-0-0 **Credits: 3** **Prerequisite:** NIL

Mapping of Course outcomes (CO) with program outcomes (PO):

CO#	CO Description	BTL	PO Mapping
CO1	Understanding the concept of Bigdata and its challenges in real-world.	2	PO1, PO7
CO2	Apply the concepts to real-world situations to understand their data structures.	3	PO1, PO7
CO3	Apply different data analytical tools to better understand the role of big data analytics.	3	PO1, PO7
CO4	Applications of big data analytics in real-world.	3	PO1, PO7

Syllabus:

Introduction to Big Data Analytics: Definition, characteristics, Importance and benefits of big data analytics, Challenges and its considerations- Data Processing and Storage: Distributed file systems (e.g., Hadoop Distributed File System - HDFS), Map Reduce programming paradigm, NoSQL databases (e.g., MongoDB, Cassandra), Data Extraction and Preprocessing: Data acquisition and integration, Data cleaning and transformation, Data reduction and feature selection- Big Data Analytics Techniques: Descriptive analytics, Predictive analytics, Prescriptive analytics, Machine learning algorithms for big data- Data Visualization and Interpretation: Visualizing big data, Tools and techniques for data visualization, Storytelling with data. Advanced Topics in Big Data Analytics: Text mining and natural language processing, social network analysis, Stream processing and real-time analytics, Deep learning for big data, and Big Data Applications in all domains. Ethical and Legal Considerations.

Reference Text Book (s):

1. Saumyadipta Pyne. Big Data Analytics: Methods and Applications. Chapman and Hall/CRC.
2. Vignesh Prajapati. Big Data Analytics with R and Hadoop. Apress

22DS6216O **- DEEP LEARNING USING PYTHON**

L-T-P-S: 3-0-2-0 **Credits:** 4. **Prerequisite: Nil**

CO No:	CO	BTL	PO
1	To apply deep learning for different data types	4	PO1, PO6
2	To analyze data using CNN and RNN models	4	PO1, PO6
3	To analyze data using VAEs and GANs.	4	PO1, PO6
4	To analyze data using reinforcement agents and other advanced methods.	4	PO1, PO6

Syllabus:

Introduction to Deep Learning: Definition, Neural Networks-Perceptron's, Activation functions, Forward propagation and back propagation, Building a Neural Network, Python libraries-Tensor Flow, Keras, PyTorch, Handling different data types Convolutional Neural Networks (CNNs)-Architecture and Components, layers and filters; Recurrent Neural Networks (RNN) -Concept and applications-LSTM (Long Short-Term Memory) and GRU (Gated Recurrent Unit) cells, Training and generating sequences with RNNs. Generative Models and Variational Autoencoders (VAEs)- Concept understanding, VAE for generating new data; Generative Adversarial Networks (GANs)-Training GANs and generating new data. Deep Reinforcement Learning-Agents, Q-learning, policy gradients, and actor-critic methods; Advanced Deep Learning Techniques-Attention mechanisms and transformer models, Deep learning for natural language processing (NLP), Deep learning for computer vision tasks. Ethical implications of deep learning.

Reference Book(s):

1. Chollet, F. (2017). *Deep learning with Python*. New York, NY: Manning Publications.
2. Downey, A. (2015). *Learning with Python*.
3. Davy Cielen, Arno D.B. Meysman, Mohamed Ali, *Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools,* Dream Tech Press.

22DS6217O - **ADVANCED SQL FOR DATA SCIENCE**

L-T-P-S: 3-0-2-0 Credits: 4. **Prerequisite: Nil**

CO No:	**CO**	**BTL**	**PO**
1	To analyze MySQL data by applying basic SQL functions	4	PO1, PO6
2	To analyze the data using statistical functions in excel.	4	PO1, PO6
3	To analyze the data using data analysis tool pack.	4	PO1, PO6
4	To analyze the data using basic tools and excel-solver.	4	PO1, PO6

Syllabus:

Revision of SQL Commands- DQL-SELECT; DDL-CREATE, ALTER; DML-INSERT, UPDATE, DELETE; DCL-GRANT, REVOKE; JOINS- left, right, inner, full, cross, self; SET Operations - UNION, INTERCEPT, EXCEPT, Handling Multi-table joins and complex relationships, Aggregating data by GROUP BY and HAVING; Analysing data using Statistical Functions - AVERAGE, AVERAGEIF & AVERAGEIFS, COUNTIF, COUNTIFS, STDEV & STDEVP, VAR, VARP, FREQUENCY, FORECAST, GROWTH, TREND, CONFIDENCE. Statistical data analysis using Data Analysis Tool pack - Descriptive statistics; Parametric vs Non-parametric tests, chi-square test, T-test-one sample, two sample, paired, ANOVA -One way; Covariance, Correlation, Regression Analysis-Simple & Multiple. Using SQL for Exploratory data Analysis; Using SQL in database systems -MySQL, PostgreSQL, Oracle; Using SQL, Integrating SQL with programming languages like R or python; Advanced data manipulation techniques- pivot tables and charts; Power Pivot, Power Charts, Array Formulas; Text-to columns and flash fill, Conditional formatting, what-if analysis, Introduction to Excel Solver for optimization problems.

Reference Book(s):

1. Clydebank Technology. (2015). *SQL QuickStart guide*. North Charleston, SC: CreateSpace Independent Publishing Platform.

2. Beaulieu, A. (2020). *Learning SQL* (3rd ed.). Sebastopol, CA: O'Reilly Media.
3. Molinaro, A. (2006). *SQL Cookbook*. Sebastopol, CA: O'Reilly Media.

22DS6218O: BUSINESS ANALYTICS IN MARKETING-II

L-T-P-S: 3-0-2-0 **Credits:** **Prerequisite: Nil**

Course Outcomes (CO):

CO No:	CO	BTL	PO
1	To Understand the application of R for Marketing Data	2	PO1
2	To examine the Product and Sales Performance of a firm	4	PO1, PO2, PO5
3	To Analyze the effectiveness of pricing Strategies adopted by retailers	4	PO1, PO2, PO5
4	To Analyze the impact of location, promotion strategies and other areas of Marketing.	4	PO1, PO2, PO5

Syllabus:

Recap of Marketing Concepts-Marketing, Marketing Mix, Product Mix, Brand, Promotion Mix, Service Marketing Mix, Revision of Basics of R and Exercise on Evaluating the Service Marketing Mix of a Retail Outlet/Hotel or any service using R. Product and Sales Analytics - Developing a New Product Using Conjoint Analysis, Opinion of Customers on the New Product using logistic Regression, Impact of Private labels on Store Sales Using Linear Regression, Sales Forecasting Using Time-Series Analysis. Price Analytics - Price Elasticity of Demand Using Linear Regression, Price Optimization, Place and Promotion Analytics - Impact of location and AdvCost on the Company Sales Using Multiple Regression Analysis, Impact of Sales Promotions on Sales of a Company Using ANOVA, Impact of Brand Equity on Sales of a Company, Optimizing Media Mix, Other Areas of Marketing-Customer Analytics-Evaluating Customer life time value, Market-Basket Analysis in Retailing, Web Analytics using Text mining and Spatial Regression.

Note: Using Excel Commander and SPSS for reviewing the results of R.

Making a Mini Project for the recap of concepts.

Textbook(s):

1. Chapman, C., & Feit, E. M. (2015). *R for Maketing Research and Analytics.* Switzerland: Springer International Publishing.
2. Winston, W. L. (2014). *Maketing Analytics :Data -Driven Techniques With Microsoft Excel.* Indiana: John Wiley & Sons.

Reference Book(s):

3. Ohri, A. (2012). *R For Business Analytics.* NewYork: Springer.
4. Karunakaran. (2013). *Marketing Management-Texts and Cases in Indian Context*. Benguluru: Himalya Publishing House.

22DS6219O**: BUSINESS ANALYTICS IN FINANCE –II**

L-T-P-S: 3-0-2-0 Credits: 4 Prerequisite: Nil

Mapping of Course outcomes (CO) with program outcomes (PO):

Co. No.	Course Outcomes	BTL	PO
1	To forecast the time series data using econometrics models in R	2	PO4
2	To analyze the pricing of derivatives in R	4	PO4
3	To analyze the pricing of options in R	4	PO7
4	To analyze Credit Risk Modelling using Logistic Regression in R	4	PO7

Syllabus:

Time series Analysis in R: Linear time series modelling and Forecasting-Cointegration-Modeling Volatility-GARCH model Specification-GARCH Model Estimation-Forecasting. Derivatives Pricing in R: The Black-Scholes Model – The Cox Ross Rubinstein Model-Connection between the two models- Greeks-Implied volatility. Options in R: European Calls and Puts-Barrier Options-Perpetual American Options-Option Greeks-Binominal Pricing of European and American Options. Credit Risk Modelling using Logistic Regression in R – Credit Default Data Analysis, Fitting Model & predicting the probabilities, checking accuracy. Segmentation of the Financial Customer Data using Cluster Analysis. Factor Analysis of Bank Data.

Recommended Text Book (s):

1. George Daroczi, Michael Puhle, Marton Michaletzsky, Zsolt Tulassay, Kata Varadi and Agnes Vidovics Dancs, Introduction to R for Quantitative Finance, Packt Publishing 2013.

2. Basic econometrics by Gujarati

Reference Text Book(s):

1. Introductory econometrics for Finance by Chris Brooks 2nd Ed.

22DS6220O: PEOPLE ANALYTICS –II

L-T-P-S: 3-0-2-0 **Credits: 4** **Prerequisite: Nil**

Mapping of Course outcomes (CO) with program outcomes (PO):

Co. No.	Course Outcomes	BTL	PO
1	Students will be able to learn what combination of data, technologies, and tools can be used in people management processes to improve an organization's performance.	2	PO4
2	Students will understand how and when hard data is used to make soft-skill decisions about hiring and talent development.	2	PO4
3	Able to learn skills in the company's talent management decisions.	2	PO7
4	This course in People Analytics is designed to help them flourish in their career.	3	PO7

Syllabus:

Talent Engagement Analytics Importance of Employee Engagement - Employee Engagement Surveys - Making Employee Engagement Surveys - Predictive - Moving Beyond the Survey: Employee Engagement Measures - Analytical Performance Management - Why You Should Care about Performance Management Analytics - Linking Individual Objectives to Company - Defining Performance Measures - Performance Incentives and Promotion - Provide Insight to Senior Management - Benefits of Analytical Performance Management - Predictive Analytics and Graph Theory to Optimize Career - Pathways and Employee Promotion - Employee Lifetime Value and Cost Modeling - Understanding the Most Expensive Asset - Are Employees Costs or Assets - The Basis for Advanced Analytics - Using Retention Analytics to Protect Your Most - Valuable Asset - Traditional Approaches - Employee Wellness, Health, and Safety to Drive - Business Performance and Loyalty - Employee Wellness - Optimizing Your Employee Wellness Health and Workplace Safety with Predictive Analytics - Big Data and People Analytics - Big Data and People Analytics - Leveraging People Analytics - Workforce Planning Analytics Pillar - Sourcing Analytics Pillar - Acquisition/Hiring Analytics Pillar - Onboarding, Culture Fit, and Engagement Pillar - Performance Assessment and Development and Employee Lifetime Value Pillar - Employee Churn and Retention Pillar - Employee Wellness, Health, and Safety Pillar - Future of People Analytics - Rise of Employee Behavioral Data - People Analytics Moves beyond the Averages - Predictive Becomes the New Standard - Automated Big Data Analytics - Big Data Empowers Employee Development -

Models Become the New Gold of People Analytics - People Analytics Becomes More Accessible - People Analytics Becomes a Specialized Department - Employee Data Privacy Backlash - Quantification of HR.

Text Book(s):

1. People Analytics in the era of Big Data by Jean Paul Isson, Jesse.S. Harrio, Wiley Publishers

Reference Book(s):

1. Dipak Kumar Bhattacharyya. HR Analytics-Understanding Theories and Applications. Sage Publications.