

Year:II

Semester: I

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
MCA201	Optimization Technique	3	3	1	-	4
MCA202	Data Warehousing and Data Mining	3	3	1	2	6
MCA203	Digital Marketing and Marketing Management	3	3	1	-	4
MCA2**	Specialization 3	3				
MCA2**	Specialization 4	3				
MCA204	Project-II	3			4	4
	Total	18				

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Year:II

Semester: II

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
MCA251	Thesis	10				
	Total	10				

****Specialization Areas:**

Specialization area courses have been designed in four major areas for in-depth knowledge in the area. Students develop specialized expertise in the specialization area. Students are required to take four specialization courses from the selected area, two courses each in second and third semester of the MCA program. Specialization areas are Information System Management, Networking and Cloud Computing, E-Commerce and Web Application Development, and Artificial Intelligence and Business Analytics.

Courses for specialization should be chosen from one of following four areas of specialization. Same area of specialization should be followed for choosing courses for specialization in the subsequent semesters.

A. Information System Management

For Year: I and Semester: II (Specialization 1 and Specialization 2)

MCA171: IT Entrepreneurship and Supply Chain Management

MCA172: Computer based Accounting and Financial Management

MCA173: Enterprise Resource Planning

For Year: II and Semester: I (Specialization 3 and Specialization 4)

MCA221: Micro, Macro Economics, and Digital Economics

MCA222: Fundamentals of Marketing and Business Strategy

B. Networking and Cloud Computing

For Year :I and Semester :II (Specialization 1 and Specialization 2)

MCA178: Cloud Security

MCA179: Network System Administration

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Year :II and Semester :I(Specialization 3 and Specialization 4)

MCA228: Open Source Linux Administration

MCA229: Wireless Network and Mobile Computing

MCA230: Internet of Things

C: Digital-Commerce and Web Application Development

Year :I and Semester :II(Specialization 1 and Specialization 2)

MCA185: Digital-Commerce

MCA186: Digital-Governance

MCA187: Multimedia and Application

MCA188: Mobile Computing and WAP Based Application

Year :II and Semester :I(Specialization 3 and Specialization 4)

MCA235: Big Data

MCA236: Database Programming

MCA237: Business Analytics

MCA238: Mobile Application Development

D: Artificial Intelligence and Business Analytics

Year :I Semester: II(Specialization 1 and Specialization 2)

MCA192: Artificial Intelligence

MCA193: Machine Learning

MCA194: Business Intelligence, Analytics and Data Science

MCA195: Big Data Management

Year :II Semester :I(Specialization 3 and Specialization 4)

MCA242: Supply Chain analytics

MCA243: Marketing Analytics

MCA244: Internet and social Media Marketing

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objective:

After completing this subject, students will be able to apply the concept of linear programming, duality theory, assignment method, queuing theory, etc. to solve real life business problems.

Course Contents:**1. The Linear Programming Problem****[7 Hrs]**

Introduction; Formulation of linear programming problem; Benefits and limitations of linear programming; Graphical solutions to linear programming problem; Standard LP form and its basic solutions; Simplex method; Artificial variable techniques: Two-phase method, Big-M method.

2. Duality in Linear Programming**[6 Hrs]**

Concept of duality; Fundamental properties of duality; duality and simplex method; Dual-simplex method.

3. Transportation Problem**[7 Hrs]**

Introduction; Mathematical formulation of transportation model; Transportation problem as a linear programming problem; Finding initial basic feasible solutions: North-West corner, Least-cost method, and Vogel's approximation methods; Moving towards optimality; Degeneracy.

4. Assignment Problem**[7 Hrs]**

Introduction; Mathematical formulation of assignment model; Solution of assignment problem; Multiple optimal solutions; Unbalanced assignment problem; Hungarian algorithm; Maximization in assignment model; Restrictions on assignment.

5. Integer Linear Programming**[7 Hrs]**

Introduction; Gomory's All - I.P.P. method; Construction of Gomory's constraints; Fractional Cut method - All integer; Fractional Cut method - Mixed integer; Branch and Bound method.

6. Queuing Theory**[6 Hrs]**

Introduction; Definition of terms in queuing model; Single infinite channels; Production model: Multi-channel service infinite queue, Finite population model.

7. Project Management**[5 Hrs]**

Introduction to CPM and PERT; Basic differences between CPM and PERT; CPM/PERT network components and precedence relationship; Critical path analysis: Forward pass method, Backward pass method.

Reference Books:

1. "Operation Research", Kanti Swarup, P.K. Gupta, Man Mohan, Sultan Chand & Sons
2. "Operation Research – An Introduction", Hamdy A. Taha, Prentice Hall of India
3. "Operation Research – Theory & Applications", J. K. Sharma, Macmillan

MCA 202 Data Mining & Data Warehousing

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objectives:

The main objective of this course is to provide concepts of Data Warehousing and Data Mining. It also introduces various techniques and tasks involved in Data Mining.

Course Contents:

Unit 1: Introduction to Data Warehousing and Data Mining

[3 Hrs]

Definition of Data Warehousing, Data Warehouse versus Operational Database systems, Definition of Data Mining, Data mining versus Traditional Data Analysis, Data mining techniques, Data Mining Tasks, Data Mining Applications, Future of Data mining

Unit 2: Data Warehouse and OLAP Technology for Data Mining

[3 Hrs]

Data warehouse, Multidimensional data model, Data warehouse Architecture and Implementation, Data Cube Technology, From Data Warehouse to Data Mining

Unit 3: Data Preprocessing

[3 Hrs]

Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation

Unit 4: Data Mining Primitives, Languages and System Architectures

[3 Hrs]

What defines Data Mining Task? Data Mining Query Language, Architecture of Data Mining Systems.

Unit 5: Mining Association Rules in Large Databases

[5 Hrs]

Association Rule Mining, Mining single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transactional Databases, Mining Multilevel Association Rules from Relational Databases and Data Warehouse, From Association Mining to Correlation Analysis. Constraint Based Mining.

Unit 6: Classification and Prediction

[10 Hrs]

Introduction to Classification and Prediction, Decision Trees, Bayesian Classification, Classification by Backpropagation, Classification based on Concept from Association Rule Mining, Other Classification methods, Prediction, Classifier Accuracy.

Unit 7: Cluster Analysis

[4 Hrs]

Introduction – Cluster Analysis, Partitioning Methods, Hierarchical methods, Density-Based Methods, Grid Based Methods, Model Based Clustering methods, outlier Analysis.

Unit 8: Mining Complex Types of Data

[8 Hrs]

Multidimensional Analysis and Descriptive Mining of Complex Data objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Database, Mining the World Wide Web.

Unit 9: Application and Trends in Data Mining

[6 Hrs]

Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining, Social Impacts of Data Mining, Trends on Data Mining.

Laboratory Works:

The following experiments are to be performed in the laboratory.

1. Create an Employee Table with training data set which includes attributes like name, id, salary, experience, gender and phone number with the help of Data Mining Tool WEKA.
2. Create a weather table with training data set which includes attributes like outlook, temperature, humidity, windy, play with the help of Data Mining Tool WEKA.
3. Apply Pre-Processing techniques to the training data set of Weather Table.
4. Apply Pre-Processing techniques to the training data set of Employee Table
5. Normalize Weather Table data using Knowledge Flow.
6. Normalize Employee Table data using Knowledge Flow.
7. Finding Association Rules for Buying data.
Use the following training data set for Buying Table.
@relation buying
@attribute age {L20,20-40,G40}
@attribute income {high,medium,low}
@attribute stud {yes,no}
@attribute creditrate {fair,excellent}
@attribute buyscomp {yes,no}
8. Finding Association Rules for Banking data.
Use the following training data set for Banking Table.
@relation bank
@attribute cust {male,female}
@attribute accno {0101,0102,0103,0104,0105,0106,0107,0108,0109,0110,0111,0112,0113,0114,0115}
@attribute bankname {sbi,hdfc,sbh,ab,rbi}
@attribute location {hyd,jmd,antp,pdtr,kdp}
@attribute deposit {yes,no}
9. Finding Association Rules for Employee data.
Use the following training data set for Employee Table.
@relation employee-1
@attribute age {youth, middle, senior}
@attribute income {high, medium, low}
@attribute class {A, B, C}
10. To Construct Decision Tree for Weather data and classify it.
Use the following training data set for Weather Table.
@relation weather
@attribute outlook {sunny, rainy, overcast}
@attribute temperature numeric
@attribute humidity numeric
@attribute windy {TRUE, FALSE}
@attribute play {yes, no}
11. To Construct Decision Tree for Customer data and classify it.
Use the following training data set for Customer Table.
@relation customer
@attribute name {x,y,z,u,v,l,w,q,r,n}
@attribute age {youth,middle,senior}
@attribute income {high,medium,low}
@attribute class {A,B}
12. To Construct Decision Tree for Location data and classify it.
Use the following training data set for Location Table.
@relation location
@attribute age {21,24,25}
@attribute location {hyd,blr,kdp}
13. Write a procedure for Visualization for Weather Table.
14. Write a procedure for Visualization of Banking Table.
15. Use the following training data set for Location Table.

@relation bank

@attribute cust { male,female }

@attribute accno { 0101,0102,0103,0104,0105,0106,0107,0108,0109,0110,0111,0112,0113,0114,0115 }

@attribute bankname { sbi,hdfc,sbh,ab,rbi }

@attribute location { hyd,jmd,antp,pdtr,kdp }

@attribute deposit { yes,no }

16. Write a procedure for cross-validation using J48 Algorithm for weather table.
17. Write a procedure for Clustering Buying data using Cobweb Algorithm.
18. Write a procedure for Banking data using Farthest First Algorithm.
19. Write a procedure for Employee data using Make Density Based Cluster Algorithm.
20. Write a procedure for Clustering Customer data using Simple KMeans Algorithm.

Reference Books:

1. “Data Mining: Concepts & Techniques”, Jiawei Han, Micheline Kamber, Elsevier
2. “Data Mining”, Pieter Adrianns, Dolf Zantinge, Addison Wesley
3. “Data Warehousing in the Real World”, Sam Anahory, Dennish Murray, Pearson Education
4. “The Data Warehouse ToolKit”, Kimball R., Wiley

MCA 203 Digital Marketing and Marketing Management

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objective:

The objective of the course is to familiarize students with the concepts and techniques of digital marketing and marketing management.

Course Contents:

Unit 1: Introduction to Digital marketing [2 Hrs]

Definition of Digital Marketing, Differences between traditional and Digital Marketing, Digital Marketing as a tool of success for companies, Importance of Digital marketing, Differences among Blog, Portal and Websites

Unit 2: Search Engine Optimization(SEO) [2 Hrs]

On page optimization techniques , Off page Optimization techniques , Reports

Unit 3: Social Media Optimization (SMO) [6 Hrs]

Introduction to social Media Marketing ,Facebook Marketing, Twitter Marketing, LinkedIn Marketing, Google Plus Marketing

Unit 4: Search Engine Marketing [5 Hrs]

Introduction to Search Engine Marketing, Tools used for Search engine Marketing, Display advertising techniques

Unit 5: Marketing in Changing World Environment [3 Hrs]

Meaning of marketing; marketing tasks; marketing management; marketing management philosophies; dynamism in business and marketing; marketing mix components and decision areas in marketing; marketing environment.

Unit 6: Marketing Research and Marketing Information System [3 Hrs]

Marketing research; marketing research process and areas; components of marketing information system; database marketing.

Unit 7: Market Segmentation, Targeting and Positioning Strategy for Competitive Advantages [4 Hrs]

Levels and patterns of market segmentation; segmentation of consumer and business markets; evaluation and selection of market segments; product positioning strategies, concept and application of unique selling proposition.

Unit 8: Consumer Market Behavior and Customer Analysis**[3 Hrs]**

Consumer buying behavior; buyer decision process; business market and business buyer behavior; customer value, costs and satisfaction; cost of lost customer and customer retention; customer relationship management; introduction to government marketing and service marketing.

Unit 9: Market Analysis**[3 Hrs]**

Market size; growth; profitability; cost structures; identification of key success factors.

Unit 10: Product Policy and New Product Development**[5 Hrs]**

Concept of product; classification of products; major product decisions; product line and product mix; branding; packaging and labeling; product life cycle strategies; new product development process; consumer adoption and diffusion of innovation processes; product line and mix strategies; brand building and brand equity; service product management.

Unit 11: Pricing Strategies**[2 Hrs]**

Pricing policies and strategies; new product pricing; product mix pricing; price adjustment strategies; initiating and responding to price changes in the market.

Unit 12: Distribution Channels and Physical Distribution Decisions**[3 Hrs]**

Marketing channel decisions; channel designs and selection; distribution nature and trends; channel role, power, and conflicts.

Unit 13: Marketing Planning and Control**[4 Hrs]**

Strategic and tactical marketing plans; planning tools: BCG and GE matrix and portfolio models; the planning process; feedback and control.

Reference Books:

1. "Marketing Management", Philip Kotler, Pearson Education
2. "Strategic Market Management", David A. Aaker, John Wiley & Sons
3. "The Oxford Textbook of Marketing", Ketith Blois, Oxford University Press

MCA204CO Project II

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
				60		40	

Course Objective:

To design and complete the software project in any platform. On the completion of the project, students will be able to develop small scale software using the concepts of system analysis and design, software engineering and user interface design.

Course Contents:

There should be a total of 60 hours covering important features of any development platform that students choose. A software development project will be assigned to students individually. A relevant topic shall be identified and instructed to each student. Students must develop the assigned software, submit written report, and give oral presentation.

General Procedure:

1. Topic Selection
2. Information Gathering
3. System Requirements and Specifications
4. Algorithms and Flowcharts
5. Coding
6. Implementation
7. Documentation

The project document shall include the following:

1. Technical description of the project
2. System aspect of the project
3. Project tasks and time-schedule
4. Project team members
5. Project supervisor
6. Implementation of the project

MCA 221: Micro, Macro Economics, and Digital Economics

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objectives:

The basic theme of this course is to develop analytical knowledge of the student show that Micro Economic Theories can be properly used for optimum utilization of resources and proper decision making regarding the firm. It also attempts to focus on different Macro Economic issues, problems, policies needed for Macro Economic stability in the country. It also aims to acquaint fundamental knowledge regarding Digital Economics and its rapid growth in the present global context.

Course Contents:

Part A: Micro Economics

Unit 1: Consumer's Behaviour

[7 Hrs]

Indifference Curve, Map, Properties, Marginal Rate of Substitution, Price Line, Consumer's Equilibrium, Price Effect, Income Effect and Substitution Effect.

Unit 2: Theories of Production

[8 Hrs]

Cobb-Douglas Production Function, Law of Variable Proportions, ISO-quants Curve, Map, Properties, Marginal Rate of Technical Substitution, ISO-Cost Line, Optimum Combination of Inputs, Laws of Returns to scale with ISO-quants curve.

Unit 3: Product and Factor Pricing

[9 Hrs]

Equilibrium of the firm under perfect competition in Short Run and Long Run. Price output Determination under Monopoly in Short-Run and Long Run, Price-output Determination under Discriminating Monopoly, Price-Output Determination under Monopolistic Competition in Short Run and Long Run. Oligopoly-features, Modern Theory of Distribution

Part B: Macro Economics

Unit 4: Theories of Employment

[4 Hrs]

Say's Law of Market, Classical Theory of Output and Employment. Principles of Effective Demands—Its application in developing nations.

Unit 5: Macro Economic Components

[6 Hrs]

Consumption Function, Psychological Law of Consumption, Saving Function, Paradox of Thrift, Investment Function, Multiplier—Leakages, Concept of Super Multiplier and Accelerator.

Unit 6: Growth Models

[2 Hrs]

An Overview of Harrod and Domar growth Models

Unit 7: Stabilization Policies

[6 Hrs]

Monetary Policy—objectives, instruments, significance, Fiscal Policy—objectives, instruments, significance, A Contra Cyclical Budgetary policy.

Part C: Digital Economics

Unit 8: Digital Economy

[6 Hrs]

Definition, Features, Growth of Digital Commerce, Digital Banking and Digital Money. Their Pros and Cons in the context of Developing Nations. Sweden—1st Cashless Economy of the World—A brief analysis.

Reference Books:

Abel, A.B. & Bernanke, B.S (2003) “Macro Economics”, Pearson Education, Singapore.
Ahuja, H.L (1998) “Advance Economic Theory”, S. Chand & Co, New Delhi
Ahuja, H.L (2004) “Macro Economic Theory and Policy”, S. Chand & Co, New Delhi
Browning, E.K & Browning, J.M (1996) “Micro Economic Theory and Application”, Kalyani Publication, New Delhi
Chopra, P.N (1997) “Principles of Economics”, Kalyani Publication, New Delhi
Dewett, K.K (1998) “Modern Economic Theory” Shyam Lal Charitable Trust, Delhi
Dwivedi, D.N (2004) “Micro Economic Theory and Applications” Pearson Education, Delhi
Dwivedi, D.N (2004) “Micro Economic Theory and Policy” Tata McGraw Hill, New Delhi
Jhingan, M. L (2002) “Micro Economic Theory” Vrinda Publication, Delhi
Koytsoyannis, A (1998) “ Modern Micro Economics”, MacMillan London
Shapiro, A (2001) “Macro Economic Analysis”, Galgotia Publication, New Delhi
UNCTAD (2019) “Digital Economy Report: Value Creation and Capture: Implication to Developing Countries”, United Nation Publication

MCA222 Fundamentals of Marketing and Business Strategy

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objective:

This course provides an introduction to the fundamentals of marketing and business strategy. Basic marketing concepts and tools with the new marketing realities help apply marketing activities in the marketplace evolving with internet. The course also aims to make students acquainted with the fundamentals of business strategy which requires the knowledge of concepts in strategic management. The student will be able to understand strategies at different levels, based on the conducted analyses.

Course Contents:

Unit 1: Introduction

[7 Hrs]

Marketing Concepts and Tools: Definition of Marketing, Core Marketing Concepts (Target Markets, Positioning, and Segmentation, Offering and Brands, Marketing Channels, Paid, Owned, and Earned Media, Impressions and Engagement, Value and Satisfaction, Supply Chain, Competition, Marketing Environment, Marketing Mix), The New Marketing Realities (Technology, Globalization, Social Responsibility) Company Orientations toward the Marketplace (The Production Concept, The Product Concept, The Selling Concept, The Marketing Concept, The Holistic Marketing Concept) .

Unit 2: Collecting Information and Forecasting Demand

[9 Hrs]

Components of a Modern Marketing Information System, Internal Records (The Order-to-Payment Cycle, Sales Information Systems, Databases, Data Warehousing, and Data Mining), Marketing Intelligence System, Collecting Marketing Intelligence on the Internet, Communicating and Acting on Marketing Intelligence, Analyzing the Macroenvironment (Needs and Trends, Identifying the Major Forces, The Demographic Environment, The Economic Environment, The Sociocultural Environment, The Natural Environment, The Technological Environment, The Political-Legal Environment), Forecasting and Demand Measurement (The Measures of Market Demand, A Vocabulary for Demand Measurement).

Unit 3: Managing Digital Communications: Online, Social Media, and Mobile

[6 hrs]

Online Marketing (Advantages and Disadvantages of Online Marketing Communications, Online Marketing Communication Options), Social Media (Social Media Platforms, Using Social Media), Word of Mouth (Forms of Word of Mouth, Creating Word-of-Mouth Buzz), Measuring Effects of Word of Mouth, Mobile Marketing (The Scope of Mobile Marketing, Developing Effective Mobile Marketing Programs, Mobile Marketing across Markets).

Unit 4: Introduction to Strategic Management

[7 Hrs]

The Concept of Strategy, Strategic Decision Making (Issues in Strategic Decision-Making), Introduction to Strategic Management Level (Definition of Strategic Management, Four Phases in Strategic Management, Elements in Strategic Management Process, Model of Strategic Management Process).

Unit 5: Hierarchy of Strategic Intent

[10 Hrs]

Strategic Intent (Understanding Strategic Intent, Concepts of Stretch, Leverage, and Fit), Vision (The Nature of Vision, Defining Vision, The Benefits of having a Vision, The Process of Envisioning), Mission (Understanding

Mission, Defining Mission, How are Mission Statements Formulated and Communicated?, Characteristics of a Mission Statement), Business Definition (Defining Business, Dimensions of Business Definition, Levels at which Business could be Defined), Business Model, Goals and Objectives (What is objective, Roles of Objectives, Characteristics of Objectives, Issues in Objective-setting, How are Objectives Formulated?, Balanced Scorecard Approach to Objectives-setting, Critical Success Factors, Key Performance Indicators (KPIs).

Unit 6: Business Strategy: Differentiation, Cost Leadership, and Integration [5 Hrs]

Business-Level Strategy: How to Compete for Advantage (Strategic Position, Generic Business Strategies), Differentiation Strategy: Understanding Value Drivers (Product Features, Customer Service, Compliments), Cost-Leadership Strategy: Understanding Cost Drivers (Cost of Input Factors, Economies of Scale, Learning Curve, Experience Curve), Business-Level Strategy and the Five Forces: Benefits and Risks (Cost-Leadership Strategy, Differentiation Strategy), Integration Strategy: Combining Cost Leadership and Differentiation (Value and Cost Drivers of Integration Strategy, Integration Strategy Gone Bad: Stuck in the Middle).

Unit 7: Business Strategy: Innovation and Entrepreneurship [4 Hrs]

Competition Driven by Innovation, The Innovation Process, Strategic and Social Entrepreneurship, Innovation and the Industry Life Cycle (Introduction, Growth, Shakeout, Maturity, Declining Stage), Types of Innovation (Incremental vs Radical Innovation, Architectural vs Disruptive Innovation, The Internet as Disruptive Force, Open Innovation.

Reference Books:

1. Kazmi, Azhar & Kazmi, Adela (2015). *Strategic Management*, (4th Ed.). New Delhi, McGraw Hill Education (India) Private Limited.
2. Kotler, Philip & Keller, Lane Kevin (2016). *Marketing Management*. (15th Global Edition). New York, Pearson Education Limited.
3. McCarthy, E. Jerome & Perreault, William D. Jr. (1993). *Basic Marketing: A Global-Managerial Approach*. (11th ed.). Boston, IRWIN.
4. Rothaermel, Frank T. (2015). *Strategic Management*. (2nd ed.). New York, McGraw Hill Education.

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objectives:

The main objective of this course is to make students understand the technical details of Linux operating system, work with various Linux command and understand file hierarchical structuring, Administrate user, manage and configure packages in Linux, Know and configure the various internet services.

Course Contents:**Unit 1: Introduction****[8 Hrs]**

Linux: The Operating System: Linux Distributions, Difference Between Linux and Windows, Separation of the GUI and the Kernel, Understanding Linux Kernel, Installing Linux in a Server Configuration, Booting and Shutting Down Process, Concept of Root, Basic commands, working with vi Editor

Unit 2: Understanding files and File System**[6 Hrs]**

Understanding Files and Directories in Linux, File Structure and hierarchy, File Permissions, File Management and Manipulation, Managing File System

Unit 3: Managing Packages & Users**[8 Hrs]**

Installing and removing Software in Linux, Getting and Unpacking the Package, Configuring the Package, Compiling the Package, Installing the Package, Managing Users and Groups

Unit 4: DNS**[5 Hrs]**

Installing a DNS Server, Configuring a DNS Server, DNS Records Types, Setting Up BIND Database Files, The DNS Toolbox, Configuring DNS Clients.

Unit 5: Web Server**[6 Hrs]**

Understanding the HTTP Protocol, Installing the Apache HTTP Server, Starting Up and Shutting Down Apache, Configuring Apache

Unit 6: E-Mail Server**[6 Hrs]**

Understanding SMTP, Installing the Postfix Server, Configuring the Postfix Server, Running the Server, POP and IMAP Basics, Installing the UW-IMAP and POP3 Server

Unit 7: Samba Server**[6 Hrs]**

The Mechanics of SMB, Samba Administration, Using SWAT, Creating a Share, Mounting Remote Samba Shares, Creating Samba Users, Using Samba to Authenticate Against a Windows Server

Laboratory Work:

The following practical shall be performed in the laboratory

1

- a. Partitioning drives
- b. Configuring boot loader (GRUB/LILO)
- c. Network configuration
- d. Setting time zones
- e. Creating password and user accounts
- f. Installing and removing packages
- g. Shutting down

2. Working with basic commands

3. Linux system administration

- a. Becoming super user
- b. Temporarily changing user identity with su command
- c. Using graphical administrative tools
- d. Administrative commands
- e. Administrative configuration files

4. Configuring NICs with Network Device Configuration Utilities (ip and ifconfig)

5. Install and configuring a DNS Server with a domain name of your choice.

6. Install and configuring DHCP server and client

7. Install and configuring Mail Server

8. Install and configuring Apache Web Server for hosting websites

9. Securing a simple network with Linux firewall (Netfilter/iptables)

10. Setting up Samba Server to share files and printers with Windows-based and other operating systems

Reference Books:

1. Linux Administration: A Beginner's Guide, Wale Soyinka, McGrawHill
2. UNIX and Linux system administration Handbook Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, Dan Mackin, Pearson Education
3. Linux: The Complete Reference, Sixth Edition, Richard Petersen McGrawHill
4. Linux All-In-One for Dummies, Emmett Dulaney, Wiley India

MCA229CO Wireless Network and Mobile Computing

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objective:

The main objective of this course is to understand the opportunities and limitations of wireless and mobile networking and computing, their potential for growth, how they relate to Internet technology, and how they can cooperate. This course brings the insight and knowledge of the underlying networking technologies, architectures and protocols, as well as principles of mobile computing and its enabling technologies together.

Course Contents:

Unit 1: Overview of Wireless Network

[4 Hrs]

Introduction, Types of Wireless Network, Wireless Networking Standard, GSM Services, GSM System Architecture, Space Division Multiple Access, Time Division Multiple Access, Frequency Division Multiple Access.

Unit 2: Wireless Medium Access control,CDMA, 3G, 4G and 5G Networks [10 Hrs]

Modulations, 3G Mobile services: IMT2000 and UMTs, Medium Access Control, Exposed and Hidden terminals problems and power control for Medium Access, MAC Algorithms, WLAN and CSMA/CA, Wireless protocols, SDMA, TDMA, FDMA and CDMA, Direct sequence spread spectrum, Frequency Hopping Spread Spectrum, Code Division Multiple Access, Applications of 3G Mobile services, WCDMA 3G,OFDM,High Speed Packets Access, MIMO in HSPA, Long Term Evolutions and Wimax 16E,Ultra Wideband and BroadBand, Wireless Access, 4G Networks: HS-OFDM,LTE Advanced and Wimax 16M,Upcoming 5G Networks Features.

Unit 3: Wireless Sensor Network:

[4 Hrs]

Basics of Wireless Sensor Network, Sensor Network Applications, Distributed Wireless Sensor Network and its Characteristics, WSN Protocol, TinyOS.

Unit 4: Overview of Mobile Communication

[8 Hrs]

Introduction, Frequencies for Signal Propagation, Modulations, Multiplexing(SDMA, TDMA, FDMA, CDMA), Uses of space spectrum, Circuit and Packet Switching Networking, Global System for Mobile Communication (GSM), Mobile voice and data Communications standard - Enhanced data rates for GSM Evolution, GPRS and 2.5G, New-generation Mobile

Communication Standards: 3G Networks, 4G Network, 5G Network.

Unit 5: Mobile Computing Architecture

[9 Hrs]

Mobile IP, Cellular and WLAN Wi-Fi IEEE, 802.11X Networks, AdHoc Networks, Wireless Personal Area Networks, Mobile Enterprise Networks, Mobile Cloud Networks, Mobile Computing, Mobile Computing Operating System, Mobile Computing Architecture, Client server computing using Mobile, WAP and HTTP Protocols, Design Considerations for Mobile Computing, Mobile Computing and the Apps, Limitations of Mobile Devices, Security Issues, Security and fault tolerance, transaction processing in mobile computing environment

Unit 6: Services Discovery, Wireless Enterprise, and Virtual and Cloud Networks [4 Hrs]

Services Discovery, Wireless Enterprise-Network, Virtual Network, Mobile Cloud Network.

Unit 7: Database Management Issues in Mobile Computing

[6 Hrs]

Data Organization Methods, Mobile Device Database Management, Mobile Device Data Store Methods, Client-Server Computing with Adaptation for Mobile Computing, Database Transactional Models, Data Recovery Issues.

Laboratory works:

1. Basic Configuration of Wireless Networks
2. Observe the MAC Settings for Networking Devices
3. Evaluating Radio Frequency (RF) Loss
4. Modifying AP Transmit Power and Antenna Diversity
5. Investigating Co-Channel Interference
6. Measuring Ad Hoc Mode Throughput
7. Measuring Infrastructure Mode Throughput
8. Setup VPN (Virtual Private Network)
9. Set a MAC address filter on wireless AP
10. Configure WEP (Wired Equivalent Privacy) on wireless AP
11. Page 15.875.10 Set dynamic WEP keys on wireless AP
12. Setting Cisco Migration Mode on wireless AP
13. Setting Up WPA (Wi-Fi Protected Access) on wireless AP
14. Setting up WPA2 on wireless AP

Reference Books:

1. Raj kamal: Mobile Computing, Oxford University Press
2. Martyn Mallik: Mobile and Wireless Design Essentials, Wiley India
3. Ashok Talukder, Roopa Yavagal, Hasan Ahmed: Mobile Computing, Technology, Applications and Service Creation, Tata McGraw Hill
4. Iti Saha Misra: Wireless Communications and Networks, 3G and Beyond, Tata McGraw Hill
5. Jochen Schiller, "Mobile Communications", Pearson Education

MCA230 Internet of Things

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objectives:

The objectives of this course are to provide theoretical as well as practical knowledge of fundamentals of Internet of Things to make students capable of designing, implementing and managing the issues of IoT in their personal as well professional life.

Course Contents:

Unit 1: Introduction to IoT

[6 Hrs.]

- Introduction to Internet of Things
- History of IoT
- IoT Architecture
- IoT Frameworks
- Benefits of IOT
- Applications of IOT

Unit 2: Fundamental IoT Mechanisms and Key Technologies

[8 Hrs]

- Identification of IoT Objects and Services,
- Structural Aspects of the IoT,
- Environment Characteristics,
- Traffic Characteristics,
- Scalability,
- Interoperability,
- Security and Privacy,
- Open Architecture,
- Key IoT Technologies,
- Device Intelligence,
- Communication Capabilities,
- Mobility Support,
- Device Power,
- Sensor Technology,
- RFID Technology,
- Satellite Technology

Unit 3: IoT Protocols**[6 Hrs]**

- Protocol Standardization for IoT
- Efforts
- M2M and WSN Protocols
- SCADA and RFID Protocols
- Unified Data Standards – Protocols
- IEEE 802.15.4
- BACNet Protocol
- Modbus
- Zigbee Architecture
- Network layer
- 6LowPAN
- CoAP
- Security

Unit 4 : IoT with RASPBERRY PI**[9 Hrs]**

- Building IOT with RASPBERRY PI
- IoT Systems
- Logical Design using Python
- IoT Physical Devices & Endpoints
- IoT Device
- Building blocks
- Raspberry Pi -Board
- Linux on Raspberry Pi
- Raspberry Pi Interfaces
- Programming Raspberry Pi with Python

Unit 5: Internet of Things Privacy, Security and Governance**[6 Hrs]**

- Vulnerabilities of IoT
- Security requirements
- Threat analysis
- Use cases and misuse cases
- IoT security tomography and layered attacker model
- Identity establishment
- Access control
- Message integrity
- Non-repudiation and availability
- Security model for IoT.

Unit 6: Real- World Applications and Case Studies**[10 Hrs]**

- Real world design constraints and challenges
- Applications and Asset management,
- Industrial automation
- Smart Metering Advanced Metering Infrastructure
- Smart grid
- e-Health Body Area Networks
- Commercial building automation
- Smart cities - participatory sensing
- Data Analytics for IoT
- Software & Management Tools for IoT
- Cloud Storage Models & Communication

- APIs
- Cloud for IoT
- Amazon Web Services for IoT

Laboratory Works:

The practical work consists of all features of IoT .

Reference Books:

1. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
2. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015
3. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011. 3.
4. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
5. Jan Ho" ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
6. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012
7. Hakima Chaouchi, " The Internet of Things Connecting Objects to the Web" ISBN : 978-1- 84821-140-7, Willy Publications
8. Daniel Kellmereit, Daniel Obodovski, "The Silent Intelligence: The Internet of Things",. Publisher: Lightning Source Inc; 1 edition (15 April 2014). ISBN-10: 0989973700, ISBN-13: 978- 0989973700. 4. Fang Zhaho, Leonidas Guibas, "Wireless Sensor Network: An information processing approach", Elsevier, ISBN: 978-81-8147-642-5.

MCA235 Big Data

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objectives:

The objective of this course is to familiarize the concept of big data in business intelligence and big data analytics and perform map-reduce analytics.

Course Contents:

Unit 1: Introduction

[5 hrs]

- Overview of Big Data
- Background of Data Analytics
- big data use in Distributed system
- development of big data,
- Current Trend in Big Data Analytics
- benefits of Big data, Applications of Big data

Unit 2: MapReduce Applications

[8 Hrs]

- Map reduce fundamentals
- MapReduce workflows
- anatomy of Map Reduce job run,
- Fault tolerance
- Real world problems
- Scalability goal
- Optimization and data locality
- Parallel Efficiency of Map-Reduce

Unit 3: Data Management

[12 Hrs]

- Structured and Unstructured Data
- Taxonomy of NoSQL Implementation
- Schemaless databases
- Basic architecture of Hbase, Cassandra and MongoDB
- Partitioning and combining, composing map-reduce calculations

Unit 4: Fundamentals of HADOOP

[10 Hrs]

- Analyzing data with Hadoop,
- Hadoop streaming,
- Hadoop pipes and design of Hadoop ,
- distributed file system (HDFS) ,
- HDFS concepts, Hadoop I/O,
- data integrity,

- compression,
- serialization,
- file-based data structures

Unit 5: HADOOP Tools

[10 Hrs]

- Data model and implementations
- Hbase examples
- Cassandra data model with examples
- Cassandra clients, pig data model
- developing and testing Pig Latin scripts
- Hive
- data types and file formats
- HiveQL data definition
- HiveQL data manipulation
- HiveQL queries.

Laboratory Works:

The practical work consists of all features of big data.

Reference Books:

1. Jeffrey Dean, Sanjay Ghemawat, Map reduce, "simplified data processing on large clusters
2. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
3. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
4. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
- 5 . Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

MCA236 Database Programming

Year II

Semester I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objectives:

The main objective of this course is to provide practical knowledge of database programming using PL/SQL, Oracle forms and reports in an Oracle environment.

Course Contents:

1. Introduction

[5 Hrs]

- 1.1 Overview of data, database, DBMS,RDBMS,ORDBMS
- 1.2 Importance and needs of DBMS
- 1.3 Database administrator and other database users
- 1.4 Relationship among data(one to one, many to one, many to many)
- 1.5 Database Models (Hierarchical, Network, Relational)
- 1.6 Codd's Rule of relational database management System

2. SQL

[10 Hrs]

- 2.1 Introduction to SQL
- 2.2 SQL Commands (DDL,DML,DCL,TCL)
- 2.3 Creating database and Users
- 2.4 Categories of SQL Statements
- 2.5 Oracle Data types
- 2.6 The CREATE, DROP, ALTER Statement
- 2.7 Integrity Constraints (Entity, Domain, Referential Constraints)
- 2.8 DML Statements (Select ,Insert, delete, Update)
- 2.9 Transaction Control Statements(Commit, Rollback, Save point)
- 2.10 Data Control Statements(Grant, Revoke)
- 2.11 Comparison Operators, IN and NOT IN Operators, BETWEEN Operator
- 2.12 The LIKE Operator, Logical Operators, IS NULL and IS NOT NULL,
- 2.13 set operators, Union, Union all, Intersect, Minus, GROUP BY Clause,
- 2.14 HAVING Clause, The DISTINCT Keyword, Miscellaneous Functions,
- 2.15 Mathematical Functions, String Functions, Date Functions, Conversion Functions

3. Joining Tables

[4 Hrs]

- 3.1 Joins, Cartesian Product ,Inner Joins, Equi-Join, Outer Joins, Right Outer Join, Left Outer Join, Full Outer Join

- 4. Locks and Partition of Tables** [4 Hrs]
4.1 Introduction
4.2 Row level and table level lock
4.3 Table partitions
4.3 Maintaining Partitions
- 5. Database Objects** [4 Hrs]
5.1 Synonyms
5.2 Views
5.3 Index
5.4 Sequences
5.5 Abstract data type
5.6 Nested tables
- 6. PL/SQL** [8 Hrs]
6.1 SQL vs. PL/SQL, A Few Simple Examples
6.2 Saving Procedures
6.3 Simple Exception Handling
6.4 Advantages of PL/SQL
6.5 Standard Data Types
6.6 Initialization
6.7 Variable Names
6.8 Specialized Data Types - %TYPE, %ROWTYPE
6.9 Decision Making Statements
6.10 Simple Loops, Loops – for, while, Cursors, Cursor Manipulation, Using the Cursor, For Loops Cursors, Cursor Attributes, Cursor Parameters
- 7. Functions ,Procedures and Triggers** [5 Hrs]
7.1 Creating a Procedure, Example Procedure, Using Parameters
7.2 Functions
7.3 Procedures and Exceptions
7.4 Triggers, Simple Example of Triggers
- 8. Oracle Forms and Reports** [5 Hrs]
8.1 Introduction to Forms and Reports
8.2 Building applications using Forms
8.3 Various types of reports
8.4 Designing reports
8.5 Building Menu

Laboratory Work:

There shall be lab exercises covering all features of above chapters in an Oracle environment.

Reference Books:

1. Ivan Bayross, “Commercial Application Development using Oracle developer 2000’

MCA237 BUSINESS ANALYTICS

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Course Objective:

The basic objective of this course is to provide students with the foundation needed to apply data analytics to real-world challenges concerning decision making by using appropriate software tools for solving a variety of business problems. The course equips students with the modeling and problem solving skills and techniques in business analytics.

Course Contents:

Unit 1: Introduction to Business Analytics

[4 Hrs]

Overview of Business analytics, Scope of Business analytics, Data for Business Analytics, Models in Business Analytics, Problem Solving with Analytics

Unit 2: Visualizing and Exploring Data

[5 Hrs]

Data Visualization, Tools and software for data visualization, Geographic data, Data bars, color scales, and icon sets, Data queries: table, sorting and filtering, Statistical methods for summarizing data

Unit 3 Probability distribution and Data Modeling

[4 Hrs]

Random Variables and Probability Distribution, Discrete Probability Distribution, Continuous Probability Distributions, Random Sampling from Probability Distributions, Modeling and Distribution Fitting, Distribution Fitting with Analytic Solver Platform

Unit 4 Trendiness and Regression Analysis

[6 Hrs]

Modeling Relationships and Trends in Data, Simple Linear Regression, Residual Analysis, Multiple linear Regression, Regression with Analytic Solver Platform and Crystal Ball Software

Unit 5 Forecasting Techniques

[6 Hrs]

Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models, Forecasting using Crystal Ball Software

Unit 6 Spreadsheet Modeling and Analysis

[5 Hrs]

Strategies for Predictive Decision Modeling, Building Models Using Simple Mathematics Implementing Models on Spreadsheets, Spreadsheet Applications in Business Analytics, Analyzing Uncertainty and Model Assumptions, Model Analysis Using Analytic Solver

Unit 7 Linear optimization

[5 Hrs]

Building linear optimization models, Characteristics of linear optimization models, Solver outcomes and

Unit 8 Monte Carlo Simulation and Risk Analysis**[6 Hrs]**

Spreadsheet models with random variables, Monte Carlo Simulation Using Analytic Solver Platform, Monte Carlo Simulation using Crystal Ball Software, Spreadsheet models with random variables, Interpreting simulation reports

Unit 9 Decision Analysis**[4 Hrs]**

Formulating Decision Problems, Decision Strategies with Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Reference Books:

1. James Evans, Business Analytics, Pearson Education, 2013.
2. Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Business analytics Principles, Concepts, and Applications Pearson FT Press, 2014.

MCA 238 Mobile Application Development

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

Objective:

The main objective of this course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals.

Course Contents:

Unit 1: Introduction

[5 Hrs]

- History of mobile devices
- Modern mobile operating systems and their architecture
- Wireless communications standards
- Data transmission standards
- Software distributions systems for mobile devices
- Preparing programming tools for a mobile application developer

Unit 2: Mobile Platforms

[5 Hrs]

- Mobile programming languages
- Challenges with mobility and Wireless communication
- Location-aware applications
- Mobile platform constraints
- Emerging technologies

Unit 3: Introduction to Android:

[4 Hrs]

- Introduction to Android platform:
 - virtual machine,
 - development tools,
 - Java packages,
 - emulators,
 - services
- Folder structure of an android project
- Anatomy of Android Application,
- Android Manifest File and its common settings

Unit 4: Android Application Design Essentials

[8 Hrs]

- User Interface Screen elements,
- Designing User Interfaces with Layouts,
- Android View Hierarchy system

- Linear and Relative Layout elements and essential attributes
- Building responsive layout with constraint Layout
- Adding motion to layout using Motion Layout
- Creating List with RecyclerView
- Styling layout elements with style assets
- Drawing and Working with Animation.

Unit 5: Writing basic application in Android

[8 Hrs]

- Android Context & Application Context
- Hello world application in android
- Activities and Activity Life Cycle
- Event Handling
- Services & Intents - Receiving and Broadcasting Intents,
- Using Intent Filter,
- Providing necessary permissions to application from manifest and run time permissions

Unit 6: Data handling in android

[5 Hrs]

- Using Android Data and Storage APIs
- Data management using SQLite
- Using Android preferences,
- Sharing Data Between Applications with content providers

Unit 7: Developing real time application

[5 Hrs]

- Using common android APIs
- Android Telephony APIs
- Application security and permissions: security architecture, application signing, user identification, file access, declaration and verification of permissions
- In app messaging using broadcast
- Consuming RESTful APIs in android application

Unit 8: Debugging, Testing & Deployment

[3 hrs]

- Testing Android applications,
- Localization of applications, application signing, version management, licenses, preparing for distribution
- Publishing Android application,
- Deploying Android Application to the World.

Unit 9: Recent Concepts & Trends

[2 hrs]

- Application Monetization
- Introduction to Location Kit
- Introduction to ML Kit

Laboratory Exercises:

Exercise 1

- Preparing environment for android studio
- Hello World Application in android
- Deploying in simulator & real device

Exercise 2

- Creating Applications with Multiple Activities
- Message passing with Intents
- Setting Permissions in manifest as well as real time permission

Exercise 3

- Menu driven applications and Parsing XML Files
- Using Recycler View for list of items

Exercise 4

- Graphics Support in Android
- Drawables & Assets
- Playing with animations in Android

Exercise 5

- Using SQLITE in Android
- State management using SharedPreferences

Exercise 6

- Content Providers
- Media Store

Exercise 7

- Location Services and Google Maps in Android
- Obtaining User Location
- Creating Status Bar Notifications

Exercise 8

- Distributing APK manually
- Distributing via Google Play Store
- Concept of App Monetization

Reference Books:

1. Mobile Computing: Technology, Applications, and Service Creation – Asoke K. Talukder, Roopa R. Yavagal - McGraw-Hill Communications Engineering 2007
2. Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) 4th Edition
3. Android in Practice - Charlie Collins, Michale Galpin, Matthias Kaeppler –Manning publications 2012

MCA242 Supply Chain Analytics

Year: II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme					
Theory	Tutorial	Practical	Internal		Final		Total	
3	1	2	Theory	Practical	Theory	Practical	100	
			20	20	60	-		

Course Objective:

The main objective of course is to introduce how data analytics and machine learning can be applied in the supply chain management field to provide meaningful insights in decision making.

Course Contents:

Unit 1: Introduction

[3Hrs]

Definition of Supply chain, Need of Supply Chain, Structure of Supply Chain, Supply Chain Process, Supply Chain Flows, Supply Chain Management, Business Analytics, Supply Chain Analytics, SMART Goals of Supply Chain Analytics

Unit 2: Data driven Supply Chain

[7 Hrs]

Data and its value in supply Chain Management, Data Source in supply chains, Big Data, Introduction to Python

Unit 3: Data Manipulation

[5 Hrs]

Data loading and writing, Data Indexing and selection, data Merging and Combination, Data Cleaning and Preparation, Data Computation and aggregation

Unit 4: Data Visualization

[8Hrs]

Data Visualization in Python, Creating a figure in Python, Formatting a figure, Plotting simple charts, Plotting with Seaborn, Geographic mapping with Basemap, Visualizing wiStarbucks Location

Unit 5: Customer Management

[4 Hrs]

Customers in Supply Chain, Benefits of Customer-Centric Supply Chain, Building Customer Centric Supply chain, Cohort Analysis, RFM Analysis, Clustering Algorithms

Unit 6: Supply Management

[4 Hrs]

Procurement in Supply Chains, Supplier Selection, Supplier Evaluation, Supplier Relationship Management, Supplier Risk Management, Supplier Selection Examples, Regression Algorithms

Unit 7: Warehouse and inventory Management**[4 Hrs]**

Warehouse Management, Inventory Management, Warehousing Optimization, Classification Algorithms

Unit 8: Demand Management**[5 Hrs]**

Demand Management, Demand Forecasting, Time Series Forecasting, Machine Learning Methods

Unit 9: Logistics Management**[5 Hrs]**

Definition of Logistics Management, Mode of Transports in Logistics, Logistics Service providers, Global Logistics Management, Logistics Network design, Route Optimization

Reference books:

1. Kurt Y. Liu, "Supply Chain Analytics : Concepts, Techniques and Applications", Palgrave macmillan

MCA243 Marketing Analytics

Year: II
I

Semester:

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objectives:

Marketing analytics enhance the quality of business decision making by helping organizations better understand customers and competitors. The objective of the course is to show students the benefits of using a systematic and analytical approach to marketing decision-making.

Course Contents:

Unit 1: Introduction to Marketing Analytics [7 Hrs]

Meaning, Definition and Importance, A brief statistics review (Measures of Central Tendency, Measures of Dispersion, The Normal Distribution, Confidence Intervals, Relations among two variables: Covariance and Correlation, Probability and Sampling Distribution).

Unit 2: Dependent Variable Techniques [10 Hrs]

Modelling Dependent Variable Techniques (Dependent equation vs inter-relationship type statistics, Deterministic vs probabilistic equations, Modelling elasticity, Using the model, Segmentation and Elasticity Modelling: Description of Dataset, Segmentation and Elasticity Modelling (Overview of Elasticity Modeling, From point elasticity to modelling elasticity, Own-price vs cross-price and substitutes, Modelling Output by Segment, Test vs Control).

Unit 3: Using Logistic Regression for Market Basket Analysis and Panel Regression [9 Hrs]

Concept of Market Basket, Logistic Regression, How to estimate/predict the market basket, Panel Regression, Using Cross-Sectional Time Series (Introduction to panel regression, Panel regression details: Data structure, The fixed effects model, The random effects model).

Unit 4: Using Excel to Summarize Marketing Data [7 Hrs]

Slicing and Dicing Marketing Data with Pivot Tables, Using Excel **Charts** to Summarize Marketing Data, Using Excel Functions to Summarize Marketing Data.

Unit 5: Using Excel to Forecast [11 Hrs]

Simple Linear Regression and Correlation: Simple Linear Regression, How Excel Determines the Best-Fitting Line, Computing Errors or Residuals, Defining R^2 , Accuracy of Predictions from a Trend Line, Using Correlation to Summarize Linear Relationships (Finding a Correlation with the Data Analysis Add-in, Correlation and Regression Toward the Mean), Using Crystal Ball for Forecasting and Other Simulation tools.

Unit 6: Implementing Big Data and Big Data Analytics [4 Hrs]

Introduction to Big Data, Importance of Big Data, What Big Data mean for Analytics and Strategy, Big Data Analytics, Big Data—Exotic Algorithms.

Reference Books:

1. Grigsby, Mike (2018). *Marketing Analytics*. (2nd ed.). United Kingdom, Kogan Page Limited.
2. Winston, Wayne L. (2014). *Marketing Analytics: Data-Driven Techniques with Microsoft® Excel®*. Indiana, John Wiley & Sons, Inc.
3. Mizik, Natalie & Hanssens, Dominique M. (Eds.). (2018). *Handbook of Marketing Analytics*. United Kingdom, Edward Elgar Publishing Limited.
4. Rackley, Jerry (2015). *Marketing Analytics Roadmap: Methods, Metrics, and Tools*. Apress, DOI: 10.1007/978-1-4842-0259

MCA244 Internet and Social Media Marketing

Year :II

Semester: I

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

Course Objective:

The main aim of the course is to provide students with a comprehensive understanding of how digital technologies and the rise of social media are changing marketing strategies and tactics across different industries. This includes learning about marketing concepts that are relevant in the digital environment, analyzing best practice examples, and developing skills for creating, delivering and communicating value by using digital marketing tools and social media platforms.

Course Contents:

Unit 1: Introduction to Digital Marketing: [5 Hrs]

The new digital world - trends that are driving shifts from traditional marketing practices to digital marketing practices, the modern digital consumer and new consumer's digital journey. Marketing strategies for the digital world-latest practices.

Unit 2: Social Media Marketing [8 Hrs]

Introduction to Blogging, Create a blog post for your project. Include headline, imagery, links and post, Content Planning and writing. Introduction to Face book, Twitter, Google +, LinkedIn, YouTube, Instagram and Pinterest; their channel advertising and campaigns.

Unit 3: Acquiring & Engaging Users through Digital Channels [10 Hrs]

Understanding the relationship between content and branding and its impact on sales, search engine marketing, mobile marketing, video marketing, and social-media marketing. Marketing gamification, Online campaign management; using marketing analytic tools to segment, target and position; overview of search engine optimization (SEO).

Unit 4: Designing Organization for Digital Success [10 Hrs]

Digital transformation, digital leadership principles, online P.R. and reputation management. ROI of digital strategies, how digital marketing is adding value to business, and evaluating cost effectiveness of digital strategies.

Unit 5: Digital Innovation and Trends [9 Hrs]

The contemporary digital revolution, digital transformation framework; security and privatization issues with digital marketing Understanding trends in digital marketing – Nepal, India and global context, online communities and co-creation

Unit 6: Mobile Marketing**[3 Hrs]**

Mobile platforms; Mobile web and applications; Mobile commerce and show rooming; Location-based services

References Books:

1. Moutsy Maiti: Internet Marketing, Oxford University Press India
2. Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015).
3. Eric Greenberg, and Kates, Alexander; Strategic Digital Marketing: Top Digital Experts Share the Formula for Tangible Returns on Your Marketing Investment; McGraw-Hill Professional (October, 2013).
4. Ryan, Damian; Understanding Digital Marketing: marketing strategies for engaging the digital generation; Kogan Page (3rd Edition, 2014).
5. Tracy L. Tuten & Michael R. Solomon: Social Media Marketing (Sage Publication)

MCA251 Thesis

Year:II

Semester: II

Course Code	Course Title	Credits	Lecture (Hrs.)	Tutorial (Hrs.)	Laboratory (Hrs.)	Total (Hrs.)
MCA251	Thesis	10				
	Total	10				

Thesis Evaluation Criteria for Internal assessment:

The marks allocated for the thesis should be evaluated based on the following criteria:

- Title identification and Proposal Writing— 10 Marks
- Mid-term Presentation — 20 Marks
- Pre-final Submission and final Presentation — 30 Marks

Thesis Evaluation Criteria for External assessment:

The marks allocated for the thesis should be evaluated based on the following criteria:

- Thesis Documentation— 20 Marks
- Final Presentation — 10 Marks
- VIVA--- 10 Marks

Note: Final Thesis should be in APA Format which is attached here with.

COURSE OUTLINE: THESIS/DISSERTATION

The Dissertation is the result of some research connected to some of the areas within Computer Science. The subject is selected together with the Research Committee. This course is mandatory for Degree of Master of Computer Application (MCA).

OBJECTIVES

- (i) To provide students with an opportunity to carry out a critical enquiry using an appropriate methodology in an area of particular interest to the student.
- (ii) To enable students to manage the work effectively, by analyzing and presenting their conclusions in a manner appropriate to the dissemination of the material and issues involved.
- (iii) In some cases to allow students to make original contribution to knowledge and practice in the area of this investigation.
- (iv) To promote wide reading of background material and to encourage students to develop the ability to integrate data and knowledge to provide an appropriate critical analysis.
- (v) To require students to manage their work effectively, by presenting a clearly defined major assignment to a deadline.
- (vi) To design a product if possible but prototype is must.

LEARNING OUTCOMES

At the end of the successful completion of the course participants will have completed a submission in accordance with the course and thus fulfilled the opportunities outlined above. Participants will be able to:

- (i) Apply the process, the clarity of thought and critical analysis required, the investigative activities and presentation of material and conclusions to other areas of knowledge and to other issues;
- (ii) Be more confident generally in the use and application of research techniques; develop methodology appropriate for their study;
- (iii) Critically evaluate and assimilate published works and research and background material appropriate for their chosen area of study;
- (iv) Benefit from the extension of their knowledge and experience in a particular subject area.

TEACHING & LEARNING ACTIVITY

The dissertation is essentially student centered but the student will be supported by tutorials and research seminars. Initially a team of dissertation tutors will advise on the development and selection issues and areas of study and also advise on the choice of a supervisor. The supervisor will supervise the dissertation in its preparation although other subject specialists may also assist informally.

REQUIRED FORMAT

Your dissertation should normally be approximately 12,000 - 15,000 words in length, (or equivalent if in an approved alternative medium). You should include an abstract of your work, bound into the front of your dissertation. The abstract should not normally exceed 200

words.

Your dissertation should be written in English, and must include at the bottom of the title page the following declaration:

“Except where stated otherwise, this Dissertation is based entirely on the author’s own work”.

Your dissertation should contain:

- 1) a clear introduction showing the objectives of the study;
- 2) a rationale for the area of study and the research approach adopted;
- 3) a discussion of the issues involved, related to published works;
- 4) appropriate investigative procedures and methods of handling the data;
- 5) a methodology for dealing with the issues and discussion of these issues;
- 6) a conclusion with possible recommendation;
- 7) Appropriate organization of material including graphical/diagrammatic displays as required and the referencing of sources, including a Reference section.

Matter which has been included in a successful submission for a degree or other qualification of any university or professional or learned body must not be embodied in any dissertation submitted under these regulations for a Master’s degree. One hard bind copy (in Black) of the dissertation must be submitted to the university and an electronic version along with other required copies to the college.

PRESENTATION GUIDELINES FOR SUPERVISORS/STUDENTS

Following activities must be followed during Dissertation.

1. Title submission
2. 0th Review (Proposal defense)
3. 1st Review
4. 2nd Review
5. Final Defense (External)

PROPOSAL

A proposal must be submitted to the concerned department with a clear view of what the students are going to do. While writing/submitting, students must read at least 20 research paper (20 References) relevant to the topics selected by students since it holds 12 Credit Hours. If failed to do so, the proposal should not be accepted and further actions should not be continued.

The proposal must in the following format.

- Abstract
- 1. Introduction
 - 1.1 Background and Significance
 - 1.2 Statement of the problem
 - 1.3 Rationale of the Study
 - 1.4 Objectives
- 2. Literature Review
- 3. Research methodology/ Design and Implementation
- 4. Schedule and Expected Results

- 4.1 Schedule
- 4.2 Expected outcomes and testing
- 4.3 Expected Innovative Points
- 4.4 Budget
- References

ASSESSMENT

An example of the marking scheme used to assess your dissertation is included at the end of this section. The following notes give you guidance on how the marking scheme will be used.

(1) Introduction, Rationale, Aims and objectives 10%

The development of the objectives and/or hypothesis is an important aspect. Marks are earned by demonstrating a clear logical development of the objective or hypothesis, explaining your reasoning. The objective or hypothesis should be a single, clearly defined statement, usually one sentence. Multiple objectives indicate that the student may not have thought through the development of the objective clearly and an element of confusion remains. The objective must clearly state the question that is to be answered.

The objective or hypothesis chosen for the dissertation must be testable, i.e. it must be possible to answer the question or evaluate the hypothesis.

(2) Background knowledge & Literature Study 20%

Background knowledge will be evidenced throughout the dissertation in the form of references. The dissertation will involve an extensive and thorough literature study in order to provide the data and information necessary to achieve the objective of the dissertation or to test the hypothesis. The breadth and depth of research will become evident from the ideas, concepts and data that are used to build the dissertation, the sources of these being referenced in accordance with one of the recognized systems of referencing.

Finally, your literature study should present a critical evaluation of the work of others and not just a summary of their findings. In other words you must interpret the work of others in the light of your research objectives.

(3) Data collection/research methodology/Design Specification and Implementation 15%

Data collection can take a number of forms, depending upon the particular objective or hypothesis of the dissertation. Masters level dissertations demand that you obtain primary (new) data or information **OR** that you undertake original use of secondary (existing) data and information. Consequently, the collection of the data may come from a number of sources like literature and published sources; questionnaires; experiment and so on.

OR

How the system is design and how will be implemented is the major issue. The dissertation should address it clearly.

(4) Analysis an evaluation of the data/ Experiment Result and Analysis 25 %

This is a crucial part of the dissertation. It is the aspect where the hypothesis/design is tested or the objective achieved. This is where the data and information collected during the research are used to achieve the objective of the dissertation. It is here that you will prove your case.

Data must be analyzed to show what they mean. It is not acceptable just to present data and information. In a dissertation you must interpret the data and information and make sense of them for the reader.

(5) Conclusions and recommendations 10%

Dissertations are expected to produce conclusions. It is therefore essential that the analysis and evaluation is undertaken thoroughly so that conclusions can be drawn. These conclusions should be substantiated and supported by the data that have been collected, analyzed and evaluated.

There are some marks available for recommendations. These relate to further research or to possible courses of action related to the topic studied. The marks for recommendations recognize the depth of thinking and study achieved during the process of researching the dissertation.

(6) Structure and presentation 5%

The marks related to the quality of the presented dissertation. It is about usability and user friendliness. The dissertation must be clearly structured and organized, easy to read, but be accurate and compiled in an appropriate academic style.

(7) Viva Voce Examination 15%

A student has a viva voce examination. You will be notified in advance and are advised to contact your supervisor for guidance on the likely format of the examination. The examination would be conducted by the external examiner(s).

Interim Presentations

Students are required to present their progress to their dissertation supervisor prior to completion. Students must attend the mid-term evaluation and pre-final evaluation before the final defense. If failed to do so, final defense may not be valid.

Dissertation Marking Schedule

Students Name:-----

Exam Roll No:-----

Topic	Comments	% of Mark	Marks Obtained
Introduction, Rationale, Aims and objectives		10%	
Background knowledge & Literature Study		20%	
Data collection/research methodology/Design Specification and Implementation		15%	
Analysis an evaluation of the data/ Experiment Result and Analysis		25%	
Conclusions and recommendation		10%	
Structure and presentation		5%	
Viva Voce Examination		15%	
Total		100%	

Additional Comments

Final Defense Date	
Pass/ Fail	
Examiner Name	
Signature	

Format of Proposal

1. Paper Size : A- 4 size paper

2. Margins :

Top : 1”
Bottom : 1.15”
Left : 1.5”
Right : 0.6”

3. Line Spacing: 1.5 lines

4. Headings - Title of Chapter

First Order Heading:

(for example – **CHAPTER 1 : INTRODUCTION**)

Font : Times New Roman (Bold face)

Size : 18 point

Alignment : Center Alignment

5. Headings – Sub headings

Second Order Heading: (for example – **1.1 Background**)

Font : Times New Roman (Bold Face)

Size : 16 point

One blank line before the heading (12 points)

Third Order Heading: (for example – **1.1.1 Abc**)

Font : Times New Roman (Bold Face)

Size : 14 point

One blank line before the heading (12 points)

6. Text

Font : Times New Roman

Size : 14 point

Alignment : Justified (Full Text)

7. Abstract (up to 200 words)

Heading (i.e. ABSTRACT)

Font : Times New Roman (**Bold Face**)

Size : 16 point

Two blank lines after the heading. (12 points)

Remaining Text

Font : Times New Roman

Size : 12 point

Alignment : Justified (Full Text)

8. Figures and Tables : Centered Placed

Caption

Font : Times New Roman (**Bold**)

Size : 10 point

Alignment : Centered

***Figure Caption must be bellow the figure and centered, Table caption must be above the table and right justified.**

9. Page Numbering (Centered)

Till page, “FIGURE INDEX”

: Roman (I, II, etc.)

For Remaining Pages

(i.e. from CHAPTER 1-to- REFERENCE) : 1, 2, N

10. References / Bibliography

Line Spacing : 1.5 Line

Font : Times New Roman

Size : 12 point

Publication details and/or URL must be in Italics.

Format:

[Citation number] Author’s Name, “Article Title”, Journal, Publisher,
Location, Year, Edition/Reprint, PP Page *No Start-End*.

[Citation number] Author’s Name, “Article Title”, Complete URL of Web
Page.

[Citation number] Author’s Name, “Title of the Book”, Publication, Edition, Year of Printing.

Header: Title- [Program Name], [Name of College], [Address]

Font -Times New Roman

Size - 12 point

Alignment - Centered

***No header should be applied to cover page, front page, and table of content and abstract.**

Footer: Title-left hand- Dissertation title

Right hand-page no (only integer)

Font -Times New Roman

Size - 12 point

Requirements for Final Report Writing:

Your report should meet following standards:

Font Name: Times New Roman

Left Margin: 1.5 inch

Right Margin: 1.25 inch

Top Margin: 1.25 inch

Bottom Margin: 1.25 inch

Header and Footer: 0.5 inch

Line Spacing: 1.5

Paragraph Spacing: 18 pt

Font Size: 12 pt (for normal text)

Follow following standard for headings

1. Heading1 (16 pt, Bold)

1.1 Heading2 (14 pt, Bold)

1.1.1 Heading3 (13 pt, Bold)

1.1.1.1 Heading4 (12 pt, Bold)

1. ARRANGEMENT OF CONTENTS:

The sequence in which the project report material should be arranged and bound should be as follows:

1. Cover Page (Sample copy 1)
2. Certificate (Sample copy 2)
3. Acknowledgment
4. Abstract
5. Table of Contents (Appendix 1)
6. List of Figures (if any) Appendix 2)
7. List of Tables (if any) (Appendix 3)
8. Abbreviations (if any) (Appendix 4)
9. Chapters
10. References
11. Bibliography (if any)
12. Appendices (if any)

** Students can add their own topics or sub-topics as per necessity.*

** Justify the report for clean look at one side of page (preferably to right side).*

** Please make sure not to use first person references (e.g., I, we, us) in the report. If self reference is required, reference may be made to “the author” or “this study”.*

2. BINDING SPECIFICATIONS:

Students have to submit **tape binding** of the report to the department at the time of report submission. **Black Hard binding** of the project report is to be submitted to the department after project defense.

SAMPLE 1 (Cover Page)



PURBANCHAL UNIVERSITY
[NAME OF COLLEGE]

Thesis No. [Program Name] [studentRegistration Number]

[DISSERTATION TITLE IN BLOCK LETTER]

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
THE DEGREE OF [PROGRAM NAME]

Submitted by

Name of Student (Exam Roll No)

[Month] [Year]

SAMPLE 2

CERTIFICATE

The undersigned certify that they have read and recommended a dissertation project entitled “.....” submitted by [**students name**] in partial fulfillment for the degree of Bachelor of Engineering in Computer Engineering.

.....

(Supervisor Name)

Supervisor

Full designation

Organization

.....

(External Examiner Name)

External Examiner

Full designation

Organization

.....

(Name)

Program Coordinator

Full designation

Organization

Appendix – 1: Table of Contents

TABLE OF CONTENTS

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1.2.2.2	25
1.2.3	30
1.3 	45
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Appendix – 4: Abbreviations

ABBREVIATIONS

RAM	Random Access Memory
HTML	Hyper Text Markup Language
PHP	PHP: Hypertext Processor

