

SRI CHANDRASEKHARANEDRA SARASWATHI VISWA MAHA VIDYALAYA

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

DEGREE OF MASTER OF COMPUTER APPLICATIONS (M.C.A)

LATERAL ENTRY (Two Years)

REGULATIONS

(Effective from the Academic Year 2017-2018)

SYLLABUS

M.C.A												
SEM	Subject Code	Subject Name	Hrs	L	T	P	I	E	T	C	Total	
III	1	LMC11	Advanced Software Engineering	5	3	2	0	40	60	100	4	28
	2	LMC1B	Open Source Technology	5	3	2	0	40	60	100	4	
	3	LMC13	Design and Analysis of Algorithm	5	3	2	0	40	60	100	4	
	4	LMC14	Advanced Java Programming	5	3	2	0	40	60	100	4	
	5	LMC15	Financial accounting	5	3	2	0	40	60	100	4	
	6	LMC1P	Open Source Technology Lab	6	0	0	6	40	60	100	3	
	7	LMC17	Advanced Java Programming Lab.	6	0	0	6	40	60	100	3	
	8	LMC18	Communication Skills	2	2	0	0	100	-	100	2	
IV	1	LMC21	Programming with C#	5	3	2	0	40	60	100	4	28
	2	LMC22	Data Communication and Networks	5	3	2	0	40	60	100	4	
	3	LM423	Data Mining and Big Data Analytics	5	3	2	0	40	60	100	4	
	4	LM424	Operations Research	5	3	2	0	40	60	100	4	
	5	LM533	Elective - I	5	3	2	0	40	60	100	4	
	6	LMC26	Programming in C# Lab.	6	0	0	6	40	60	100	3	
	7	LMC27	Data Mining and Big Data analytics Lab	6	0	0	6	40	60	100	3	
	8	LMC28	HUMAN RESOURCE DEVELOPMENT	2	2	0	0	100	-	100	2	
V	1	LMC31	Network Security	5	3	2	0	40	60	100	4	26
	2	LMC32	Organizational Behavior	5	3	2	0	40	60	100	4	
	3	LMC33	Mobile Application Development	5	3	2	0	40	60	100	4	
	4	LM534	Elective – II	5	3	2	0	40	60	100	4	
	5	LMC35	Elective – III	5	3	2	0	40	60	100	4	
	6	LM536	Mobile Application Development Lab	6	0	0	6	40	60	100	3	
	7	LMC37	Software Development Lab.	6	0	0	6	40	60	100	3	
VI	1	LMC4Z1	Project and viva voce	36	-	-	36	40	60	100	18	18
			Total Credits								147	

L – Lecture Hrs T – Tutorial Hrs P - Practical Hrs I—Internal Marks E—External Marks C- Credits

LIST OF ELECTIVES

Elective I (IV Semester)

1. Software Project Management and Quality Assurance
2. Service Oriented Architecture
3. Software documentation

Elective II (V Semester)

1. Artificial Intelligence
2. Cloud Computing
3. Multimedia Databases
4. Management Information System

Elective III (V Semester)

1. Soft Computing
2. Digital Image Processing
3. Mobile computing
4. Information Retrieval Techniques

LMC11	ADVANCED SOFTWARE ENGINEERING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To review and understand the software Process
- To understand the importance of software configuration management
- To study software metrics and cost estimation techniques
- To understand latest trends in the area of software engineering

OUTCOMES

- Understand software engineering process
- Develop skills that will enable them to construct high quality software
- Keep abreast of current trends in the area of software engineering

SYLLABUS

UNIT – I Formal modeling and verification – The clean room strategy – Functional specification – Clean room design – Formal methods concepts – Formal specification languages.

UNIT – II Software configuration management – Elements of a configuration management – SCM repository – SCM process – Configuration management for WebApps.

UNIT – III Product, Process and Project metrics – A framework for product metrics – Metrics for the requirements model – Metrics for the design model – Metrics in the process and project domains – Software measurement – Metrics for software quality.

UNIT – IV Estimation for software projects – Observation on estimation – Project planning process – Software scope and feasibility – Resources – Software project estimation – Decomposition techniques – Empirical estimation models.

UNIT – V Software process improvement and emerging trends – Approaches to SPI - SPI process – CMMI – The People CMM – Introduction to Agile: Agile model, Extreme Programming, Scrum model - Observing software engineering trends– Technology directions.

REFERENCE BOOKS

1. Roger S.Pressman, Software Engineering A Practitioner’s Approach, 7th Edition, McGraw Hill, 2010.
2. Richard Fairley, Software Engineering Concepts, McGraw Hill, 2010.
3. Ian Sommerville, “Introduction to Software Engineering”, 8th Edition, Addison-Wesley, 2

LMC1B	OPEN SOURCE TECHNOLOGY	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- Introduction to Web Technology and its applications
- Developing web scripting programs using XML, PHP, Python
Developing applications using the above mentioned web scripting platforms

OUTCOMES

- Write Web application using PHP and PYTHON.
- Design for extensibility and code reuse.
- Understand deployment options.

SYLLABUS

UNIT – I XML Overview, Syntax, documents, declaration, Tags, elements, attributes, comments, character entities, CDATA Sections, DTD's, Schemas, css, Tree structure, XQuery and XSLT

UNIT – II PHP: Introduction- Programming in Web Environment- Data Types-Variables-Constants- Control Structures-Operators-Functions-Arrays-String Manipulation and Regular Expressions.

UNIT – III Introduction to MYSQL, Setting up account-Table-Query-Datatypes-Date and Time- Primary Keys and auto increment fields, Inserting, Update, View and Delete records using PHP web scripting programs.

UNIT – IV Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator) Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

UNIT – V Python MYSQL Database – Creation, Insert, Read-Update-Delete-commit-rollback Operations, fetchone(), fetchall() and rowcount and handling errors

REFERENCE BOOKS

1. Dr.T.Lalitha, Dr.T.Padma and Dr.G.M.Kadhar Nawaz, Open Technologies, SonaVersity,
2. W. Jason Gilmore, Beginning PHP and MySQL From Novice to Professional, 3rd Edition, , Apress
3. Allen B. Downey , Think Python An Introduction to Software Design, O'Reilly, 2008
4. Deitel, "Internet and World Wide Web, How to program" 4th Edition, Prentice Hall 2008.
5. DuBois P., MySQL , Addison-Wesley Professional, 4th edition.
6. Harvey M. Deitel and Paul Deitel, Python How to Program, Pearson Publications, 2002.

LMC13	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To understand, explain, model, and analyze a given software problem as an algorithm.
- To investigate whether the algorithm found is the most efficient.
- To formulate the time order analysis for an algorithm.
- To formulate the space needs for the implementation of an algorithm.
- To prove the correctness of an algorithm

OUTCOMES

After completing this course, the student should be able to:

- To decide the appropriate data type and data structure for a given problem.
- Ability to select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.
- Ability to compare algorithms with respect to time and space complexity

SYLLABUS

UNIT – I INTRODUCTION : Definition – Algorithm specification – performance Analysis – Brute Force Approaches - Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers , Tower of Hanoi.

UNIT – II DIVIDE-AND-CONQUER APPROACH : General Method – Binary search – Finding maximum and minimum –Merge sort – Quick sort –Strassen’s Matrix multiplication

UNIT – III GREEDY METHOD : The general method – Knapsack problem – Job sequencing with deadlines – Prim’s Algorithm – Kruskal’s Algorithm – Single source shortest paths

UNIT – IV DYNAMIC PROGRAMMING : Dynamic Programming : General Method – Multistage graphs – All pairs shortest paths – 0/1 Knapsack- Travelling salesperson problem.

UNIT – V BACK TRACKING: Back Tracking: General Method – 8 Queens – Sum of Subsets – Graph Coloring – Hamiltonian cycles. Basic concepts of NP hard and NP complete problems

REFERENCE BOOKS

1. Ellis Horowitz, SartajSahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Galgotia Publications PVT Ltd., Reprint, 2010.
2. S.Sridhar, Design and Analysis of Algorithms, Oxford University Press, 2015.
3. Parag H.Dave, Himanshu B.Dave, “Design and Analysis of Algorithms”, Dorling Kindersley (India) Pvt. Ltd, 2011.

LMC14	ADVANCED JAVA PROGRAMMING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To impart the knowledge on the advanced concept of Java Programming skills.
- To provide a basic understanding and knowledge of the latest java programming concept
- To equip the students in programming skills used to relate with the IT industry
- To enable the learner for aiming careers such as programmers (Java), Developers and Program analysts

OUTCOMES

- After learning this concept they can work with the GUI environment
- They can know the concept of two tier and three-tier to access from the data base using JDBC /ODBC.
- To know the knowledge of accessing the function and remote object through RMI
- To develop a WEB Application using th JSP and java beans.

SYLLABUS

UNIT – I Components of Swing The Origins of Swing - Components and Containers - Exploring Swing - JLabel and ImageIcon – JTextField - The Swing Buttons – JtabbedPane – JScrollPane – Jlist – JComboBox – Trees – Jtable.

UNIT – II JDBC Concepts JDBC Objects – JDBC Driver Types – JDBC Packages – A Brief Overview of the JDBC Process – Database Connection – Associating the JDBC/ODBC Bridge with the Database – Statement Objects - .ResultSet – Model Programs – Tables – Inserting Data into Table.

UNIT – III Servlets Servlets – Background - The Life Cycle of a Servlet - Using Tomcat for Servlet Development - A Simple Servlet - The Servlet API - The javax.servlet Package - Reading Servlet Parameters - The javax.servlet.http Package - Handling HTTP Requests and Responses - Using Cookies - Session Tracking.

UNIT – IV RMI & BEAN Remote Method Invocation (RMI) - A Simple Client/Server Application Using RMI - Java Beans –introduction to java Bean - Advantages of Java Beans – Introspection - Bound and Constrained Properties – Persistence - Customizers - The Java Beans API - A Bean Example.

UNIT – V JSP & EJB Java Server Pages – JSP – JSP Tags – Tomcat – Request String - Enterprise JavaBeans – Deployment Descriptors – Session Java Bean – Entity Java Bean – Message-Driven Bean – The JAR File.

REFERENCE BOOKS

1. Herbert Schildt (2007), JAVA The Complete Reference – McGraw-Hill, 7th Edition, New Delhi .
2. Jim Keogh (2002), J2EE The Complete Reference, Tata McGraw-Hill Edition, New Delhi.
3. Horstmann S, Gary Cornell (2013), Core Java 2 volume 2 - Advanced Features-Prentice Hall, 9th Edition, New Delhi.
4. Hans Bergsten (2003), JavaServer Pages, 3rd Edition – O’Reilly.

LMC15	FINANCIAL AND MANAGEMENT ACCOUNTING	L	T	P	C
		3	2	0	4

OBJECTIVES

- To understand the process of estimating the cost of a particular product and basic principles of Double entry system and preparation of balance sheet

OUTCOMES

- To understand the balance sheet preparation budget preparation and control of a company and it helps to decide about the state of affairs of a particular firm / company

SYLLABUS

UNIT – I FINANCIAL ACCOUNTING : Meaning and definition of accounting – objectives of accounting – Double entry system – Journal and ledger Trial balance Final accounts with adjustment (simple problems only) – use of computer in financial accounting

UNIT – II COST ACCOUNTING: Meaning and definition of cost accounting – Classification of cost – preparation of cost sheet

UNIT – III ABSORPTION AND MARGINAL COSTING : cost volume profit analysis –break even analysis – decision making problems – use of computer in cost accounting

UNIT – IV MANAGEMENT ACCOUNTING: meaning and definition of management accounting – ratio analysis – classification of ratios – profitability – turnover and solvency ratio – use of computer in ratio analysis

UNIT – V BUDGETARY CONTROL: – meaning and objectives – functional budgets viz ., purchase budget production budget , sales budget – cash budget – flexible budget capital budgeting – methods – payback , ARR and IRR methods – discounted cash flows – net present value – use of computer in preparation of budgets

REFERENCE BOOKS

- Shukla M.C and J.S Grewal , Advanced account – S.Chand 1991.
- Reddy T.S and A.Murthy – ‘Financial accounting’ 2003 Margham publications
- Reddy T.S and Y.Hari Prasad Reddy – ‘Cost and Management Accounting’ Margham publications
- Maheswari S.N. Cost and Management accounting – Sultan & sons
- Prasad N. K Iyengar S.P Cost accounting ; Principles and practices

LMC1P	OPEN SOURCE TECHNOLOGY LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To Develop web scripting programs using XML, PHP, Python
- To Develop applications using the above mentioned web scripting platforms

OUTCOMES

- Write Web application using PHP and PYTHON.
- Design for extensibility and code reuse.
- Understand deployment options.

LAB EXERCISES

1. Create an XML Document to store an information about the student in an university.
2. Write an XSLT program to extract regno,name,Date of joining the course, Batch, Year, Illrd Semester Marks from the student document.
3. Create a student registration form using GET and POST Method in PHP.
4. Write a program in php to explain the concept of cookies and sessions.
5. Write a program to create arrays using PHP.
6. Write a PHP program for connecting the database,creation,updatation,view and deletion using tables.
7. Write a python program to print the factorial of a given number
8. Write a python program to sort the numbers using looping statements.
9. Write a python program using inbuilt functions .
10. Write a python program for connecting the database,creation,updatation,view and deletion using tables.

LMC17	ADVANCED JAVA PROGRAMMING LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To Develop programs using Advanced JAVA

OUTCOMES

- Write programs using swing concepts, JDBC, RMI, Servlets and JSP.

LAB EXERCISES

1. Program to perform the basic arithmetic operation using swing.
2. Program to implement the JTrees.
3. Program to implement the JTable
4. Program to perform the database connectivity with JDBC to create a table student and insert a record in the student database.
5. Program to retrieve and update the student database using JDBC.
6. Program to implement the concept of RMI.
7. Login form validation using HTTP Servlets.
8. Programs to implement session Handling and Cookies in Servlets.
9. Program to illustrate the concept of control statements in JSP.
10. An EJB application that demonstrates Entity Bean.

LMC18	COMMUNICATION SKILLS	L	T	P	C
		2	0	0	2

Objectives:

Students get introduced to real life situations and language to be adopted in communication.

The competence of students will be tested through Internal Assessment only.

PAPER I- COMMUNICATION SKILLS

Business Correspondence, Notice, Agenda, Minutes, Advertising, Dialogue Writing, Group Discussion, Graphic Aids, Spoken English at Situations.

Situations:

At the Post Office, At the Doctor's, At the Market, In the Library, At the Chemist's, At the Railway Station, At the Book Sellers, At the Bank, At the Hotel, A Telephone Conversation, At a Travel Agent's, Reference Material for Every day Conversation.

Book for Reference:

1. Mohan and Meera Banerji, **Developing Communication Skills**, Macmillan, India.
2. V.Sasikumar and P.V.Dhamija, **Spoken English: A Self-learning Guide to Conversation Practice**, Second Edition, Tata McGraw-Hill Publishing Company Limited, 7 West Patel Nagar, New Delhi – 110 008.

LMC21	PROGRAMMING WITH C#	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To develop background knowledge as well as core expertise in C#
- To learn the object oriented concepts
- To impart the knowledge on creation of different types of application.

OUTCOMES

- Understand the idea of CLR and .Net framework
- To impart the knowledge on basics concepts of object oriented programming
- To outline the various characteristics of c#
- To provide the familiarity in the concept of developing window application
- To converse an idea of creating web application

SYLLABUS

UNIT – I Introduction to .NET Framework- Visual Studio IDE- C# Language Fundamentals– Variables – Data Types – Operators – Expressions – Branching – Looping – Methods – Arrays –Jagged Arrays- Indexers and Properties – Structures.

UNIT – II Classes – Objects – Inheritance – Polymorphism – Interfaces – Operator overloading – Delegates – Exception handling – File I/O.

UNIT – III Building windows applications – Creating Windows Forms and Form Applications- Adding Controls and Handling Events

UNIT – IV Accessing Data with ADO.NET - ADO.NET Object Model- Using ADO Managed Providers- Working with Data bound Controls- Database Updation – Reports.

UNIT – V Programming Web Applications with Web Forms - Introduction to Web Forms- Server Controls-Validation Controls- Form Events- Web Form Life Cycle- Web Form Creation- Adding Controls- Data Binding-Building Database applications.

REFERENCE BOOKS

1. Herbert Schildt, "The Complete Reference –C#", TMH, 2004.
2. Robinson et al, "Professional C#", 2nd Edition, Wrox Press, 2002.
3. S. Thamarai Selvi and R. Murugesan, "A Textbook on C#", Pearson Education, 2003.

LMC22	DATA COMMUNICATION AND NETWORKS	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To understand the fundamentals of Data Communication and Networking

OUTCOMES

- To analyze the basic concepts of network and build different types of networks.

SYLLABUS

UNIT – I Introduction to Data Communication. Network, Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.

UNIT – II Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

UNIT – III Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet Token Bus - Token Ring - FDDI - IEEE 802.6 - SMUS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

UNIT – IV History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM ATM Topology - ATM Protocol.

UNIT – V Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

REFERENCE BOOKS

- Jean Walrand - Communication Networks (A first Course) - Second Edition - WCB/ McGraw Hill - 2002.
- Behrouz and Forouzan - Introduction to Data Communication and Networking - 2nd Edition - TMH - 2001.

LM423	DATA MINING AND BIG DATA ANALYTICS	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn the basic concepts of data mining, data warehousing and big data
- To learn how to handle large data sets
- To analyse and interpret different type of data
- To learn the different tools to analyse the data.
- To learn the various data mining techniques applicable to Big Data

OUTCOMES

By the end of this course the student should be able to:

- Describe and utilise a range of techniques for designing data mining systems.
- Understand the functionality of the various data mining and data warehousing components
- Compare the various approaches to data mining and data warehousing implementations
- Apply appropriate analytic techniques to analyzing big data using R Scripts

SYLLABUS

UNIT – I Data warehousing components-multi dimensional data model-data warehousing architecture-data warehouse implementation -OLAP –need-categorization of OLAP tools. Introduction to KDD - Data Mining functionalities

UNIT – II Data preprocessing and Association Rules : Data Preprocessing-data cleaning, Integration, Transformation, Reduction, Discretization and summarization based characterization-Association Rule Mining : Basic Concepts - Frequent Itemset Mining Methods.

UNIT – III Classification and Prediction : Classification by Decision Tree Induction – Bayesian classification-Other classification methods-prediction- Cluster analysis : Types of data in cluster analysis- Partitioning methods-hierarchical methods - Outlier Analysis detection methods- Applications of Data mining

UNIT – IV Definition – Characteristics of Big Data - Importance of Big Data - Analyst Perspective on Data Repositories - State of the Practice in Analytics - AI Versus Data Science - Current Analytical Architecture - Drivers of Big Data - Emerging Big Data Ecosystem and a New Approach to Analytics - Key Roles for the New Big Data Ecosystem - Examples of Big Data Analytics

UNIT – V Data Analytics Lifecycle Overview - Discovery - Data Preparation - Model Planning - Model Building - Common Tools for the Model Building Phase - Communicate Results - Operationalize - Review of Basic Data Analytic Methods Using R

REFERENCE BOOKS

1. Jiawei Han and Micheline Kamber —Data Mining Concepts and Techniques, McGraw – Hill , 3rd Edition ,2011.
2. EMC Education Services (Editor) , Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data(Chapter 1,2 and 3)
3. Paul C. Zikopoulos Chris Eaton Dirk deRoos Thomas Deutsch George Lapis , Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data,McGraw-Hill, 2012. (Part 1.1 and1.2)

LM424	OPERATIONS RESEARCH	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn the concepts of operations research applied in business decision making.

OUTCOMES

- To facilitate quantitative solutions in business decision making under conditions of certainty, risk and uncertainty

SYLLABUS

UNIT – I Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques - Big-M method.

UNIT – II TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

UNIT – III REPLACEMENT : Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement. SEQUENCING – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through ‘m’ machines.

UNIT – IV THEORY OF GAMES : Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT – V Network and basic components - Rules of network construction - Time calculations in networks - Critical path method (CPM) - PERT - PERT calculations - Negative float and negative Slack - Advantages of network (PERT/CPM) - Project Cost - Time Cost Optimization Algorithm - Linear Programming formulation - Precedence planning - Updating - Resource allocation Scheduling.

REFERENCE BOOKS

- Kanti Swarup, P.K.Gupta and Man Mohan, “Operations Research, Eighth Edition”, Sultan Chand & Sons, New Delhi, 1999.
- S.Hillier and J.Liebermann, Operations Research, Sixth Edition, Mc Graw Hill Company, 1995.

LMC26	PROGRAMMING WITH C# - LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To develop programming skill as well as core expertise in C#
- To impart the knowledge on creation of different types of application.

OUTCOMES

- Students are familiarized in developing simple applications using C#

LIST OF PROGRAMS

1. Console Application to implement the concept of Class and Interface.
2. Console Application to overload Unary and Binary Operators.
3. Console Application to implement Properties and Indexers.
4. Console Application to Handle Exceptions
5. Window Application to use Basic Controls.
6. Window Application using Menu option.
7. Window application to perform read and write operations in file using File I/O.
8. Window application to connect with database and manipulate the records in the database using ADO.NET.
9. Web Application to perform validation using validation controls.
10. Web application to Connect with the database using ADO.NET and manipulate the records.

LMC27	DATA MINING AND BIG DATA ANALYTICS LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn R and WEKA installation
- To Work with R scripts and objects from the R console
- To Work with WEKA using different data mining techniques

OUTCOMES

- Gain knowledge on implementing data mining and analytics concepts using WEKA and R

LAB EXERCISES

Tools : WEKA and R

1. Demonstration of preprocessing on dataset
2. Demonstration of classification rule process on datasets using Naïve bayes and decision tree classification algorithms
3. Demonstration of Attribute selection measures
4. Demonstration of clustering rule process on dataset student.arff using simple kmeans K-means clustering
5. Demonstration of Hierarchical Clustering
6. Demonstration of Association rule process on dataset using apriori algorithm
7. Demonstration of Reading data from files and working with datasets
8. Demonstration of Linear and Multi linear regression analysis using R.
9. Demonstration of Time series analysis using R
10. Demonstration of Text Analysis using R

Referencce Books

1. Ian H. Witten & Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, The Morgan Kaufmann Series in Data Management Systems , 3rd Ed., 2005.
2. Viswa Viswanathan Shanthi Viswanathan, R Data Analysis Cookbook, Packt Publishing Ltd. Birmingham B3 2PB, UK., 1st Ed., 2015.
3. A handbook of statistical analyses using R, Brian S. Everitt and Torsten Hothorn. CRC Press, Taylor and Francis Group, LLC, New York. 2nd Ed., 2010.

LMC28	HUMAN RESOURCE DEVELOPMENT	L	T	P	C
		2	0	0	2

Objective:

- To empower our students with employability skills that would enable them to excel in the corporate world.

SYLLABUS

SI.NO	TOPIC
01	Verbal Reasoning
02	Arithmetic
03	Non-Verbal Reasoning
04	Algebra and Geometry
05	Logical Reasoning
06	Data Interpretation
07	Corporate Expectations
08	Resume preparation
09	Essentials of Group Discussion
10	GD practice
11	Essentials of HR interview
12	HR interview practice

REFERENCE BOOKS

1. Quantitative Aptitude for Competitive Examinations, Abhijit Guha, Tata McGrawHill Education private Limited, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, Dr.R. S.Agarwal, S.Chand and Company private limited, New Delhi.
3. Group Discussion and Interview Skills, Priyadarshi Patnaik, Cambridge University press India private Limited, New Delhi.

LMC31	NETWORK SECURITY	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To provide necessary foundations on issues related to network security and available security services and mechanisms like cryptography, firewall, antivirus software.

OUTCOMES

- Understand the concepts and foundations of computer security
- The different security goals and how they can be achieved by means of cryptography
- To identify vulnerabilities of IT systems.

SYLLABUS

UNIT – I Introduction –Security attacks, Mechanisms and services - A model for Internet Security – Classical Encryption Techniques: Symmetric Cipher model, Substitution Techniques, Transposition Techniques, Steganography.

UNIT – II Block Cipher Principles – The Data Encryption Standard – Strength of DES – Differential and Linear Cryptanalysis – Evaluation criteria for AES – AES Cipher – Block Cipher Modes of Operations – Stream Ciphers and RC4 – Key Distribution - Principles of public key cryptosystems – RSA Algorithm - Diffie Hellman Key Exchange

UNIT – III Secure Hash Functions and HMAC - Digital signatures – Authentication Protocols – Kerberos - X.509 Authentication Service – Public Key Infrastructure - Pretty Good Privacy - S/MIME

UNIT – IV IP Security: IP Security Architecture - Combining Security Association - Key Management - Secure Socket Layer - Secure Electronic Transaction.

UNIT – V System Security: Intruders, Viruses and Related Threats - Firewall Design Principles - Trusted Systems.

REFERENCE BOOKS

1. William Stallings, "Network Security Essentials – Applications and Standards", 4th Edition, Pearson Education, 2011
2. AtulKahate, "Cryptography and Network Security", 3rd Edition, Tata McGraw-Hill, 2013.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2015.
4. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", 4th Edition, Pearson Education, 2007

LMC32	ORGANIZATIONAL BEHAVIOR	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To provide an overview of theories and practices in organizational behavior in individual, group and organizational level.

OUTCOMES

- Students will have a better understanding of human behavior in organization.
- They will know the framework for managing individual and group performance

SYLLABUS

UNIT I

Basic Concepts : Definition-nature and scope of Organizational Behavior- Need for studying Organizational Behavior, Model of Organizational Behavior (Autocratic, custodial, supportive and collegial model)

UNIT II

Individual differences: Personality - concept, Determinants, types and theories of personality. Perception - Definition & process of perception : Factors affecting perception, Perception and its application in Organization Behavior

UNIT III

Motivation: Meaning, Nature & need of Motivation. Theories of motivation: Attitude – theories of attitude - Attitude change.

UNIT IV

Communication: Nature, need, Process and channels of communication; effective communication; leadership: functions of leadership, leadership styles

UNIT V:

Organizational Structure: Organizational Structure -Meaning, characteristics and types organization structure
Organizational culture: meaning, types functions organizational change: Resistance to change & Managing Resistance to change. Organizational Development: meaning, characteristics and objectives of organization Development.

REFERENCE BOOK

1. Fred Luthens - Organizational Behaviour[chapters 1,4,5,6,7,&8], McGraw Hill Pub, 12th Edition 2011.
2. Stephen P.Robbins – Essentials of Organizational Behaviour – Prentice Hall -6 th Edition, 2000.

LMC33	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- Introduce to the android architecture and creating simple applications.
- Present different views to create user interface.
- Introduce creating android applications with any simple database.
- Present different ways of sharing data through the use of content providers.
- Introduce how to take the android application to the market.

OUTCOMES

- Learn the basics of Android Application Programming.
- Can develop Simple Android Applications..

SYLLABUS

UNIT – I Android Programming, Activities, Fragments, and Intents

Introduction to Android - Obtaining the Required Tools, Creating Android Application, Anatomy of an Android Application. Using the Android Emulator, Activities, Fragments, and Intents: Understanding Activities, Linking Activities Using Intents, Fragments, Calling Built-In Applications Using Intents, Displaying Notifications.

UNIT - II User Interface, Designing User Interface with Views

Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Creating the User Interface Programmatically, Listening for UI Notifications, Designing User Interface with Views:
Using Basic Views, Using Picker Views, Using List Views to Display Long Lists, Understanding Specialized Fragments.

UNIT – III Data Persistence

Saving and Loading User Preferences, Persisting Data to Files, Creating and Using Databases

UNIT - IV Content Providers, Messaging

Sharing Data in Android, Using a Content Provider, Creating Content Providers, Using the Content Provider, Messaging: SMS Messaging, Sending E-mail.

UNIT - V Developing Android Services, Publishing Android Applications

Creating Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading, Publishing Android Applications: Preparing for Publishing, Deploying APK Files.

REFERENCE BOOKS

1. Wei-Meng Lee, Beginning Android Application development, Wiley Publishing, 2012.
2. Neil Smyth, Android 4.2 App Development Essentials, Techotopia , 2013.
3. Mark L. Murphy, The Busy Coder's Guide to Android Development -CommonsWare , 2009.

LM536	MOBILE APPLICATION DEVELOPMENT LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn creating android applications with any simple database.

OUTCOMES

- Learn the basics of Android Application Programming and develop Simple Android Applications..

Tools:

Develop Applications using any of the following tools:

Eclipse, Android studio.

LIST OF EXERCISES

1. Design a Simple Scientific Calculator.
2. Creating Menus in Android.
3. Application explaining the Basic UI Design with all the relevant Fields.
4. A Simple application illustrating styles and themes.
5. Call Log Notification Menu.
6. A GUI Application.
7. Creating live Folders with search options.
8. A simple database application.
9. Playing a audio, video file using Android..
10. A simple offline search Engine.

REFERENCE BOOKS

1. Onur Cinar Android Apps with Eclipse, ,Apress-2012.
2. <http://developer.android.com/tools/studio/index.html>.

LMC37	SOFTWARE DEVELOPMENT LAB	L	T	P	C
		0	0	6	3

(For Students admitted from 2017 onwards)

OBJECTIVES

- To provide insights in to the process of software development

OUTCOMES

- Learn the problem domain for solving various program development using software process methodology.

Practicing the different types of case tools such as Rational Rose / other Open Source for all the phases of Software development life cycle:

Data modeling
Source code generators
Apply the following to typical application problems:
Project Planning
Software Requirement Analysis
Software Design
Data Modeling & Implementation
Software Estimation
Software Testing

A possible set of applications may be the following:

- a. Library System
- b. Student Marks Analyzing System
- c. Text Editor.
- d. Create a dictionary.
- e. Telephone directory.
- f. Inventory System.

LMC4Z1	PROJECT AND VIVA VOCE	L	T	P	C
		0	0	36	18

(For Students admitted from 2017 onwards)

OBJECTIVES

- To select the domain and develop application with social relevance

OUTCOMES

- Develop a project and submit a report with a presentation to the expert committee

ELECTIVE	SOFTWARE PROJECT MANAGEMENT AND QUALITY ASSURANCE	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To develop a good understanding of issues, techniques and tools for Software Project Management and Software quality assurance metrics
- To enable students to gain a working knowledge of techniques for software quality Standardization

OUTCOMES

- Understand the concepts of Software Project Management and Software quality assurance.
- Students develop skills that will enable them to evaluate software of high quality.

SYLLABUS

UNIT – I Software Management: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Conventional versus Modern Software Project Management

UNIT – II Software Management Process: Lifecycle Phases – Artifacts of the Process – Model Based Software Architectures – Workflows of the Process – Checkpoints of the Process - Iterative Process Planning.

UNIT – III SOFTWARE QUALITY ASSURANCE: The Software Quality Challenge – Definition and Objectives - Software Quality Factors –Development and Quality Plans.

UNIT – IV Software Quality Metrics: Classification of Software Quality metrics –Process metrics – Product metrics – Implementation of Software Quality metrics - Cost of Software Quality.

UNIT – V SOFTWARE QUALITY ASSURANCE STANDARDIZATION: Quality management standards - ISO-9000 – Series – Capability Maturity Model (CMM) - SPICE – SQA project process standards –IEEE Software Engineering standards.

REFERENCE BOOKS

1. Walker Royce “Software Project Management – A Unified Framework “, Pearson Education, 2004
2. Watts Humphery, “Managing Software Process “, Addison - Wesley, 1998.
3. Daniel Galin , “Software Quality Assurance- from Theory to Implementation “PEARSON Education Led 2004.

ELECTIVE	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To introduce the concepts of Service Oriented Architecture
- To introduce web services and cloud computing

OUTCOMES

- Understand the concepts of Service Oriented Architecture.
- Gain knowledge on SOA Architecture, SOA platform, Web Services and cloud computing concepts.

SYLLABUS

UNIT I SOA BASICS

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate Principles of service orientation – Service Layers.

UNIT II XML AND WEB SERVICES

XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser – Web Services Overview – Architecture.

UNIT III WSDL, SOAP and UDDI

WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

UNIT IV SOA in J2EE and .NET

SOA platform basics – SOA support in J2EE – Java API for XML-based web services

UNIT V CLOUD COMPUTING

Vision of Cloud computing – Cloud Definition – Characteristics and Benefits – Virtualization – Cloud computing Architecture – Cloud Reference Model, Types of Clouds – Cloud Platforms in Industry.

REFERENCES:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006.
2. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
3. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2002.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.
5. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
6. Dan woods and Thomas Mattern, "Enterprise SOA designing IT for Business Innovation", O'REILLY, First Edition, 2006.
7. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education, 2013.

ELECTIVE	SOFTWARE DOCUMENTATION	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn the basics of Software documentation.
- To know how to plan, test and prepare software documentation.

OUTCOMES

- Understand the need for software documentation.
- Planning and testing the document
- Understand the layouts and guidelines of writing the document,

SYLLABUS

UNIT I

INTRODUCTION :Need for Software Documentation - Understanding task orientation - Analyzing users - Writing user scenarios - User informational needs - Document goals - User work motivations - User analysis checklist - Constructing a task list - Categorization - Writing steps as actions - Task analysis.

UNIT II

DOCUMENTATION PLANNING :Planning and writing documents - Task list and Schedule - Guidelines - Documentation process - Documentation plan - Document review form - Review plan - Schedule -Checklist.

UNIT III

DOCUMENTATION TESTING : Usability tests - Advantages of field testing - Editing and fine tuning - Problems - Designing for task orientation - Page showing elements of document design - Screen showing elements for online help design - Solutions to the design problem for printed and online documentation.

UNIT IV

DOCUMENTATION LAYOUTS : Laying out pages and screens - Elements of page and screen design - Designing type - Effective writing style - Using graphical that support decision making - Functions of graphics - Type and elements of graphics.

UNIT V

DOCUMENTATION GUIDELINES : Writing to guide - Procedures - Guidelines - Writing to support - Reference - Structural - reference entry - Checklist - Designing index - User oriented index - Case studies.

ReferenceS

1. Thomas T. Barker , "Writing s/w documentation - a task oriented approach", Allyn & Bacon Series of Technical Communication , 1998.
2. Dan Jones, "Technical writing style", Sam Dragga, Texas University.

ELECTIVE	ARTIFICIAL INTELLIGENCE	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To learn the basics of designing intelligent agents that can solve general purpose problems.
- To Represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences.

OUTCOMES

- Identify Problems that are amenable to solution by AI Method.
- To implement basic AI Algorithms.
- Identify Appropriate AI Methods to solve a given problem.

SYLLABUS

UNIT – I PROBLEM SOLVING : Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

UNIT - II LOGICAL REASONING : Logical agents – propositional logic – inferences – first-order logic – inferences in firstorder logic – forward chaining – backward chaining – unification – resolution

UNIT - III PLANNING : Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

UNIT - IV UNCERTAIN KNOWLEDGE AND REASONING : Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models

UNIT - V LEARNING : Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning

REFERENCE BOOKS

1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2003.
2. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
4. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

ELECTIVE	CLOUD COMPUTING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To understand Cloud Computing models and Services
- Virtualization – Compute, storage and Network
- Study on Security, Storage and applications

OUTCOMES

- Strong Foundations on Cloud Computing Model and services
- Virtualization concepts on compute, storage and network
- Security and Backup solutions for cloud based services

SYLLABUS

UNIT – I Cloud Computing : Definition – Cloud Types – Characteristics of Cloud Computing – Benefits of Cloud Computing – Disadvantages of Cloud Computing – Challenges and Obstacles to cloud computing.

UNIT – I Cloud Architecture : Composability – Infrastructure – Platform – Virtual Appliances – Communication Protocols – Applications. Services: Infrastructure as a Service – Platform as a service – Software as a Service

UNIT – III Virtualization Technology : Load Balancing and Virtualization – Understanding Hypervisors: Virtual Machine types – Vmware vSphere. Administrating the clouds : Management responsibilities – Lifecycle Management.

UNIT – IV Cloud Security: Securing the cloud: The security boundary – Security service boundary – security mapping. Securing the Data: Brokered cloud storage access – Storage location and tenancy – Encryption – Auditing and Compliance. Cloud Storage: Definition – Provisioning cloud storage – Exploring Cloud Backup solutions

UNIT – V Applications in the cloud – Functionality mapping – Application attributes – Cloud service attributes – System abstraction – Cloud bursting. Communicating with the cloud: Instant Messaging – Collaboration technologies – social networks

REFERENCES

1. Barrie Sosinsky, "Cloud Computing", Wiley India Pvt. Ltd, 2011
2. Ronald L Krutz and Russell Dean Vines, "Cloud Security", Wiley Publishing, 2010
3. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education, 2013.
4. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing" Tata McGraw-Hill, 2012
5. Kris Jamsa, "Cloud Computing", Jones and Bartlett Learning, 2014

ELECTIVE	MULTIMEDIA DATABASES	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES:

- Learn different types of Databases
- Be Exposed to Query Languages
- Be familiar with Indexing Techniques

OUTCOME:

- Design different types of Databases
- Use Query Languages
- Apply Indexing Techniques

UNIT I INTRODUCTION: An introduction to Object oriented Databases - Multidimensional Data Structures - K d Trees, Point Quad trees, -The MX Quad tree - R Trees – Comparison of Different Data Structures.

UNIT II IMAGE DATABASES AND TEXT/DOCUMENT DATABASES: Raw Images - Compressed Image Representations - Image Processing Segmentation, Similarity based Retrieval – Implementations Text/Document Databases - Precision and Recall – Stop Lists – Word Stems and Frequency Tables – Latent Semantic Indexing -TV Trees – Other Retrieval Techniques.

UNIT III VIDEO DATABASES AND AUDIO DATABASES Video Databases - Organizing Content of a Single Video – Querying Content of Video Libraries – Video Segmentation – video Standards Audio Databases - A General Model of Audio Data – Capturing Audio Content through Discrete Transformation – Indexing Audio Data.

UNIT IV OBJECT MODEL AND SPATIAL DATABASES Creating Distributed Multimedia Presentations Objects in Multimedia Presentations – Specifying Multimedia Documents with Temporal Constraints – Efficient Solution for Temporal Presentation Constraints – Spatial Constraints. Introduction to Spatial Databases – Spatial Concepts and Data Models – Spatial Query Language – Spatial Storage and Indexing.

UNIT V MULTIMEDIA DATABASES Design and Architecture of a Multimedia Database – Organizing Multimedia Data Based on The Principle of Uniformity – Media Abstractions – Query Languages for Retrieving Multimedia Data Indexing SMDs with Enhanced Inverted Indices – Query Relaxation/Expansion – Web based multimedia applications.

REFERENCES

1. V.S. Subrahmanian, "Principles of Multimedia Database Systems", Morgan Kauffman, 2nd Edition, 2013.
2. Shashi Shekhar, Sanjiv Chawla, "Spatial Databases", Pearson Education, 2002.
3. Lynne Dunckley, "Multimedia Databases An object relational approach", Pearson Education, 2003.
4. B.Prabhakaran, "Multimedia Database Systems", Kluwer Academic, 1997.

ELECTIVE	MANAGEMENT INFORMATION SYSTEM	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

- To offer in depth knowledge on information systems in business and their management.

OUTCOMES

- Better understanding of MIS improves planning and decision making in management.

SYLLABUS

UNIT – I Definition of MIS- Data Processing , Decision Support Systems – Information Resources Management , End user Computing Managerial Accounting , OR Management theory Sub Systems of MIS.

UNIT – II Data Base Query Languages, Report generators , Statistical Packages , Modeling Languages , V.H.L Language. Batch system, On Line system. Communication systems, Front End Processors, LAN , WAN , Distributed Systems.

UNIT – III Logical Data Concepts , Sequencing of Data , Types of Files , Data Bases .Serial Access and Direct Access devices. Sequential , Hashed and indexed File Organization – Data Base Organization – single flat File – Hierarchical , Network, Relational DB Structures. Transaction Processing – Control and Retrieval.

UNIT – IV Decision Making Process – Problem Formulation _ programmed Vs Non Programmed Decision – Criteria for Decision Making , Classical Economical Model – Administrative Model – Resolution of Conflict – Uncertainty Avoidance – Problematic Search – Incremental Decision Making.

UNIT – V Hierarchy of planning – planning models – Computational support for planning – organizational structure Implementations and Management Theory in System Design – Decision Support systems and Expert systems – Computational support of intelligence.

REFERENCE BOOKS

1. GORDON B. DAVIS and MAGGRETHE H . OLSON , Management Information Systems , McGraw Hill International Edition - Second Edition , 1998, reprint 2007
2. Kenneth C.Laudon, Jane P.Laudon, Management Information Systems, Pearson Education, 13th Edition 2014

ELECTIVE	SOFT COMPUTING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

The student should be made to:

- Understand the basic concepts of SOFT computing
- Be familiar with genetic algorithm, Fuzzy Logic and Neural networks

OUTCOMES

At the end of the course, the student should be able to

- Explain the basics of Soft computing techniques
- Choose the between the required soft computing methodology for his/her application

UNIT I INTRODUCTION TO SOFT COMPUTING: Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS: Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction,

UNIT III NEURAL NETWORKS : Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement.

UNIT IV FUZZY LOGIC: Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference .

UNIT V NEURO-FUZZY MODELING: Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering.

REFERENCES:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer-Verlag Berlin Heidelberg, 2005.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.
6. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives, Advances in Fuzzy Systems - Applications and Theory", Vol. 7, River Edge, World Scientific, 1997.

ELECTIVE	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES:

- Learn Digital image Fundamentals
- Be Exposed to digital image processing Techniques
- Learn to represent image in form of features

OUTCOME:

- Discuss digital image fundamentals
- Apply image Enhancement and Restoration techniques
- Represent features of Images

UNIT I DIGITAL IMAGE FUNDAMENTALS

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

UNIT II IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT III IMAGE RESTORATION AND SEGMENTATION

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

UNIT IV WAVELETS AND IMAGE COMPRESSION

Wavelets – Subband coding - Multiresolution expansions - Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

UNIT V IMAGE REPRESENTATION AND RECOGNITION

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

REFERENCES

- 1.Rafael c.Gonzales,Richard E .Woods,"Digital Image Processing",Third Edition,Pearson Education,2010.
2. Anil jain.K,"Fundamentals of Digital Image processing", PHI Learning Pvt ltd, 2011.
3. William K.pratt,"Digital Image processing",John Willey,2002

ELECTIVE	MOBILE COMPUTING	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES

The student should be made to:

- Understand the basic concepts of mobile computing
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks
- Gain knowledge about different mobile platforms and application development

OUTCOMES

At the end of the course, the student should be able to

- Explain the basics of mobile telecommunication system
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Use simulator tools and design Ad hoc networks
- Develop a mobile application

SYLLABUS

UNIT – I Wireless Communication Fundamentals : Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT – II Telecommunications Systems : GSM-System Architecture-Protocols-Connection Establishment-Frequency Allocation-Routing-Handover-Security-GPRS.

UNIT – III Wireless Networks : Wireless LAN-IEEE 802.11 Standards-Architecture-Services HIPERLAN-AdHoc Network- BlueTooth

UNIT – IV Mobile Network Layer : Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics- Wireless Application Protocol -WAP

UNIT – V Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

REFERENCE BOOKS

1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003.
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002.
3. Reza, Bfar, Mobile Computing Principles Designing and Developing Mobile Applications with UML and XML, Cambridge University Press, 2005
4. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
5. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.

ELECTIVE	INFORMATION RETRIEVAL TECHNIQUES	L	T	P	C
		3	2	0	4

(For Students admitted from 2017 onwards)

OBJECTIVES:

- Learn information retrieval techniques Fundamentals
- Be Exposed to modeling, indexing and text classification techniques

OUTCOME:

UNIT I : INTRODUCTION:- Basic Concepts – Practical Issues - Retrieval Process – Architecture - Boolean Retrieval –Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics.

UNIT II: MODELING: - Taxonomy and Characterization of IR Models – Boolean Model – Vector Model - Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models - Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing

UNIT III: INDEXING:- Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching - Sequential Searching and Pattern Matching. Query Operations -Query Languages – Query Processing

UNIT IV : TEXT CLASSIFICATION:- Text Classification and Naïve Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering.

UNIT V: SEARCHING THE WEB:- Searching the Web –Structure of the Web –IR and web search – Static and Dynamic Ranking - Web Crawling and Indexing – Link Analysis.

REFERENCES:

1. Ricardo Baeza – Yates, BerthierRibeiro – Neto, Modern Information Retrieval, Pearson Education, Second Edition 2005
2. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, Introduction to Information Retrieval, Cambridge University Press, First South Asian Edition 2012
3. Stefan Buttcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval Implementing and Evaluating Search Engines, The MIT Press, Cambridge, Massachusetts London, England, 2010