SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
Sree Sainath Nagar, Tirupati

Department of Master of Computer Applications

Supporting Document for 1.1.3

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: MCA- Master of Computer Applications

Regulations : SVEC-14

The Courses (with course outcomes) under SVEC-14 Regulations which focus on ***employability/ entrepreneurship/ skill development*** are highlighted with the following colours.

Skill

Employability

Entrepreneurship

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)

Sree Sainath Nagar, A. Rangampet-517 102.

MASTER OF COMPUTER APPLICATIONS

MCA I-SEMESTER

14MC1HS01: ACCOUNTING AND FINANCIAL MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To impart the basic principles & concepts of financial accounting and Management.

II. To develop skills related to use of tools and techniques of financial management.

III. To apply the concepts of financial accounting and Financial Management for effective managerial decision making in an organization.

IV. To imbibe Professional values, ethics and skills for Professional development through application of principles of Accounting and Management.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain Knowledge in:
   - Basic Principles and concepts of Financial Accountancy.
   - Basic concepts of Financial Management.
2. Develop skills in managerial decision making of an organization.
3. Application of Financial Management concepts and Practice of Financial Accounting.
4. Ability to ascertain the profitability and soundness of the organization.
5. Provides prerequisite for advanced tools like Tally and SAP.
6. Facilitates synthesis of financial information to provide valid conclusions.
7. Follow ethical code of conduct in Accounting and Financial activities.
8. Achieve personal excellence and ability to work in an organization.
9. Develop effective Communication in Accounting and Financial transactions.
10. Provides life skills for effective Financial Management of an organization.

11. Appreciate the significance and applications of Accounting and Financial Management in lifelong learning for knowledge and skill upgradation

Detailed syllabus:-

UNIT – I : INTRODUCTION TO ACCOUNTING (**10 Periods)**
Principles, concepts and conventions, double entry system of accounting, classification of accounts, journal, ledger and trail balance.
Computerized Accounting: Introduction to computerized accounting system – advantages of computerized accounting system.

UNIT – II : PREPARATION OF FINANCIAL STATEMENTS (10 Periods)

Trading account, profit and loss account and balance sheet (with simple adjustments).

UNIT – III : FINANCIAL MANAGEMENT (10 Periods)
Meaning and scope, role and objectives. Goals of Financial Management: Profit maximization, wealth maximization, EPS maximization, overcapitalization, undercapitalization, causes for overcapitalization and undercapitalization. Capital and its significance: Types of capital and cost of capital, methods and sources of raising capital.

UNIT – IV : BREAK EVEN ANALYSIS (**10 Periods)**
Concept of Break Even Point (BEP), cost-volume-profit analysis, determination of BEP, margin of safety and profit/volume (P/V) ratio, impact of changes in cost or selling price on BEP, practical applications of break even analysis (make or buy, add or drop, choosing the product mix with a limiting factor).

UNIT – V : CAPITAL BUDGETING (10 Periods)
Features, proposals, methods of capital budgeting, payback method, Accounting Rate of Return (ARR), time value of money, Net Present Value method (NPV) , Profitability Index (PI) and Internal Rate of Return (IRR) – simple problems.

TEXT BOOKS:

1. A.R. Aryasri, **Accounting and Financial Management**, Tata McGraw Hill Education Pvt. Ltd., 1st Edition 2010. ISBN(10):0-07-068200-3

2. James C Van Horne, **Financial Management and Policy,** Prentice-Hall of India/Pearson, 12th Edition, 2001 ISBN-10: 0130326577

REFERENCE BOOKS :

1. S.P. Jain and K.L. Narang, **Financial Accounting,** Kalyani Publishers, Ludhiana, 6th Edition, 2002 ISBN 8127204242, 9788127204242.
2. P.C. Tulsian, **Financial Accounting,** Pearson Education, 2004
3. I.M. Pandey, **Financial Management,** Vikas Publishing House Pvt. Ltd., 10th Edition, 2010, ISBN- 13 9788125937142

MCA I-SEMESTER

14MC1BS01: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To gain knowledge on Mathematical concepts, develop Business processes and resolve the problems in programming languages.
II. To attain skills of basic search algorithms, to find the shortest path using Kruskal's and Prim's Algorithms.
III. To apply mathematical reasoning, Partial ordering relations and infer the Pigeonhole principles on computer applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

1. Apply the principles of discrete mathematical Structures to solve complex Application Software.
2. Formulate Complex Computing problems with substantial conclusions using Mathematical reasoning, recurrence relations and Graph Theory.
3. Design and develop mathematical models in Computer Science for real time problems/ business applications.

UNIT-I: MATHEMATICAL LOGIC AND PREDICATES (13 Periods)

Mathematical Logic and Predicates: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, Normal forms.
Predicates: Predicate calculus, Rules of inference, Consistency, Proof of contradiction

UNIT-II: FUNCTIONS AND RELATIONS (10 Periods)

Relations: Properties of binary relations, Equivalence relations, Partial ordering relations, Hasse diagrams.
Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-III: ALGEBRAIC STRUCTURES & MATHEMATICAL REASONING(12Periods)

Algebraic structures: Algebraic system Examples and general properties, Semi groups and monoids, Groups, Homomorphism, Isomorphism.
Mathematical Reasoning: Methods of Proof, Mathematical Induction, The Inclusion-Exclusion Principle, The Pigeonhole principle.

UNIT-IV: RECURRENCE RELATIONS (10 Periods)

Recurrence Relation: Generating functions of Sequences, Calculating co-efficients of Generating function, Homogeneous Recurrence relation, Solving recurrence relations by substitution and generating functions, methods of characteristic roots.

UNIT-V: GRAPHS & TREES (10 Periods)

Graphs: Introduction to Graphs, Types of Graphs, Graphical representations, Paths and Circuits, Euler and Hamiltonian Paths and Circuits, Graph Coloring.
Trees: Introduction to Trees, Binary Search Trees, Spanning Trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm, Prim's Algorithm.

Total Periods: 55

TEXT BOOKS:

1. Trembly J.P. and Manohar.P, *"Discrete Mathematical Structures with applications to computer science,"* Tata Mc Graw Hill: New Delhi, 2003.
2. Kenneth H. Rosen, *"Discrete Mathematics and its Applications,"* Tata McGraw Hill: New Delhi, 6th edition, 2008.

REFERENCE BOOKS:

1.J.L. Mott, A.Kandel , T.P Baker, *"Discrete Mathematics for Computer Scientists and Mathematicians,"* Prentice Hall India,2004.
2. Dr.D.S.Chandrasekharaiaha, *"Mathematical Foundations of computer science (discrete Structures),"* Prism Books Pvt. Ltd:India, 2006.

MCA I-SEMESTER

14MC10101: PROGRAMMING THROUGH C

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To understand various steps involved in Program development and basic concepts in C Programming Language.
II. To read and write C program that uses pointers, structures and files.
III. To help students to understand the implementation of C language.

COURSE OUTCOMES:

After the completion of the course, a successful student able to:

1. Solve the given problem using the syntactical structures of C language.
2. Develop, execute and document solution for various problems using the features of C language.
3. Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT-I: INTRODUCTION TO COMPUTERS AND C LANGUAGE AND PROGRAM CONTROL STATEMENTS (12 PERIODS)

Introduction to Computers and C Language: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, System Development; Introduction to the C Language: Structure of a C Program, Identifiers, Types, Variables, Constants, keywords, Expressions, precedence and Associativity, Evaluating Expressions, Type Conversion.

Program Control Statements: Two way selection : if, if else, nested if else. Multi way selection- else if ladder and switch statement; Repetition : concept of loop, for loop, while loop, do while loop. Break, continue and goto statement.

UNIT-II: ARRAYS, STRINGS AND POINTERS (12 PERIODS)

Arrays, Strings: Array concept, types of array: one dimensional, two dimensional and multi-dimensional arrays. Introduction to string, string representation and initialization, array of strings, string manipulation functions.

Pointers: Introduction, declaration and initialization, arithmetic operations on pointers, Array of pointers, pointer to an array, Dynamic memory management functions: malloc, calloc and realloc and free.

UNIT-III: FUNCTIONS (12 PERIODS)

Functions: Introduction to function, system defined & user defined function. Local and global variable. Parameter passing mechanism: pass by value and pass by reference. Scope, Storage classes, Recursion: recursive function, application of recursion: factorial calculation and Fibonacci number generation.

UNIT-IV: DERIVED DATA TYPES (12 PERIODS)

Derived Data Types: Introduction to structure: structure declaration and initialization, anonymous structure, accessing operators, nested structure**.** Array of structure, array within a structure, pointer to structure, passing structures through function. Union: declaration, initialization and its usage. typedef, enumerated types and bit field. Application of structure with pointer: static and dynamic linked list representation.

UNIT-V: FILES AND PREPROCESSOR DIRECTIVES (10 PERIODS)

Files and Preprocessor Directives: Introduction to file, types of file: binary and text file. Operations on File: open, close, read, write and seek. Program to implement sequential access and random access. Preprocessor directive statements and its usage. Command line argument and its usage.

TEXT BOOK:

1. B.A. Forouzan, "*A Structured programming approach using C,*" Third Edition, Cengage learning.

REFERENCE BOOKS:

1. Herbert Schiltz,"Turbo C/C++ The complete Reference," TataMcGraw-Hill
2. BS Gottrifried, A.Mittal "*Programming in C – A practical approach*," PHI, Tata MC Grawhill.

MCA I-Semester

14MC10102:COMPUTER ORGANIZATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To understand the basic structure and operations of digital computer and hierarchical memory system.
II. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
III. To find out different ways of communicating with I/O devices and standard I/O interfaces.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Aware of basic components of a computer like CPU, memories, input/output & and their organization and solve basic binary mathematical operations using the computer.
2. Apply knowledge of the processor's internal registers and operations.
3. Designing of digital components and logic circuits.

Detailed Syllabus:-

UNIT-I: DATA REPRESENTATION (10 Periods)

Data types, complements, fixed-point representation, floating-point representation, other binary codes and error detection codes, digital computers, logic gates, Boolean algebra and map simplification.

UNIT-II: DIGITAL LOGIC CIRCUITS & DIGITAL COMPONENTS (10 Periods)

Combinational circuits, flip-flops, sequential circuits, integrated circuits, decoders, multiplexers, shift registers, binary counters.

UNIT-III: CENTRAL PROCESSING UNIT (10 Periods)

Introduction, general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, Reduced Instruction Set Computer (RISC).

UNIT-IV: BASIC COMPUTER ORGANIZATION AND DESIGN (11 Periods)

Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, Memory Reference Instructions, input-output and interrupt, complete computer description, design of basic computer, design of accumulator logic.

UNIT-V: MEMORY ORGANIZATION AND INPUT -OUTPUT ORGANIZATION

(12 Periods)

Memory Organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupts, Direct Memory Access (DMA) and Input-Output Processor (IOP).

TOTAL PERIODS : 53

TEXT BOOK:

1. M. Morris Mano, "*Computer System Architecture*," 3rd Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "*Structured Computer Organization*," 5th Edition, Pearson Education, 2005.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "*Computer Organization*," 5th edition, McGraw-Hill, 2002.

MCA I – Semester

14MC10103: DATA STRUCTURES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To design and implement basic data structures like stacks, Queues Linked Lists and Trees.
II. Learn advanced nonlinear data structures.
III. To develop Programs using Data Structures.

COURSE OUTCOMES:
After the completion of the course, a successful student able to:

1. Understand the usage of data structures.
2. Analyze to solve problems using various data structures like linear list, stack, queue and trees.
3. Apply Tree and Graph structures for implementing solutions to practical problems.
4. Handle operations like, insertion, deletion, sorting and searching mechanism on various data structures.

DETAILED SYLLABUS

UNIT – I: BASIC CONCEPTS AND STACKS (11 PERIODS)

Basic Concepts: Algorithm**,** Pseudocode, The Abstract Data Type, Model for an Abstract Data Type, ADT Implementations.
Stacks: Concepts of Stack **,** Basic Stack Operations, Stack ADT and its Implementation, Applications- Recursion, Infix to Postfix Transformation, Evaluating Postfix Expressions.

UNIT II: QUEUES AND GENERAL LINEAR LISTS (12 PERIODS)

Queues: Concepts of Queue, Basic Queue Operations, Queue ADT and its Implementation Various Queue Structures : Circular Queue - Double ended queue - Priority queue, Applications-Simulation.
General Linear Lists: Basic Operations, Implementations- Single linked list, Double linked list, Circular linked list, Applications- Stacks using Linked List, Queue using Linked List, Polynomial addition, Sparse matrix implementation.

UNIT – III: SORTING AND SEARCHING (11 PERIODS)

Sorting and Searching: Sorting: Sort Concepts, Sort Stability, Sort Efficiency, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge sort, Heap Sort.
Searching: Sequential Search, Binary Search, Analyzing Search Algorithms.

UNIT – IV: TREES (11 PERIODS)

Introduction to Trees: Basic Tree Concepts, Binary Trees, General Trees.
Binary Search Trees: Basic Concepts, BST Operations, Binary Search Tree ADT, BST Applications, Threaded Trees.

UNIT – V: AVL SEARCH TREES AND GRAPHS (12 PERIODS)

AVL Search Trees – AVL Tree Basic Concepts, AVL Tree Implementations, AVL Tree Abstract Data Type, AVL Tree Algorithms; Red Black Tree: Basic Concepts ,Implementations.
Graphs: Basic Concepts, Operations, Graph Storage Structures, Graph Algorithms, Graph ADT, Minimum Spanning Tree , Prims and Kruskals, Dijkstras Algorithm.

TOTAL PERIODS : 57

TEXT BOOKS:

1. Richard F.Gilberg & Behrouz A. Forouzan, *"Data Structures A Pseudocode Approach with C,"* Thomson 2nd Edition.
2. D Samanta, *"Classic Data Structures,"* PHI Publications, New Delhi.

REFERENCES:

1. Mark Allen Weiss, *"Data Structures and Algorithm Analysis in C,"* Second Edition, Pearson Education.
2. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotiabook source, New Delhi.
3. Jean Paul Tremblay and Paul G. Soresson, "An Introduction to Data Structures with Applications", McGraw Hill International editions.

MCA I – Semester

14MC1HS02: PROFESSIONAL COMMUNICATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	2	1	-	2

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To lay basic foundation and impart knowledge of English language, grammar and communication skills.
II. To develop listening, speaking, reading and writing skills among students needed in their personal, academic and professional pursuits.
III. To train students apply the nuances of English for various communication needs.
IV. To build confidence in effective usage of English language..

COURSE OUTCOMES:

After the completion of the course, a successful student able to:

1. Acquire fundamental and functional knowledge of English language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and life-long learning.

DETAILED SYLLABUS:-

UNIT – I: IMPORTANCE OF COMMUNICATION (9 PERIODS)

Language as a tool of Communication – Characteristics of Language – Communicative Skills LSRW – Effective Communication – Modes of Communication – Verbal and Non-verbal Communication Barriers to Communication – Objective and Characteristics – Process of Communication – Levels of Communication – Visual Aids.

UNIT – II: ACTIVE LISTENING (8 PERIODS)

Introduction – Importance of Listening and Empathy – Reasons for poor Listening – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening and Note-taking.

UNIT – III: EFFECTIVE SPEAKING (8 PERIODS)

Introduction – Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – IV: READING TECHNIQUES (9 PERIODS)

Introduction – Improving Comprehension Skills – Techniques for Good Comprehension – General Kitchen Layout – Predicting the Content – Understanding the Gist – SQ3R Reading Technique – Study Skills.

UNIT – V: TECHNICAL WRITING (8 PERIODS)

Introduction – Importance – Characteristics – Audience Recognition / Analysis – Language –Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism – Referencing and Styling.

TOTAL PERIODS : 42

TEXT BOOK

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, Second edition , 2011.

REFERENCES

1. Sunitha Mishra, C. Muralikrishna, *Communication Skills for Engineers,* Pearson Education, Delhi, 2012.
2. Kavitha Tyagi & Padma Misra, *Professional Communication,* PHI Learning Private Limited, New Delhi, 2011.
3. Alok Jain, Pravin S. R. Bhatia & A. M. Sheikh, *Professional Communication Skills,* S. Chand & Company Ltd, New Delhi, 2008.
4. Rajendra Pal and J. S. Korlahalli, *Essentials of Business Communication*, Sultan Chand & Sons, Delhi, 2012.

MCA I – Semester

14MC10121: PROGRAMMING IN C AND DATA STRUCTURES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To understand various steps involved in Program development and basic concepts in C Programming Language.
II. To design and implement basic and advanced data structures like stacks, Queues and Trees.
III. To develop Programs using C and Data Structures.

COURSE OUTCOMES:

After the completion of the course, a successful student able to:

1. Understand the usage of C language features and data structures.
2. Analyze to solve problems using various data structures like linear list, stack, queue, trees.
3. Develop, execute and document solution for various problems using the features of C language.
4. Handle operations like, insertion, deletion, sorting and searching mechanism on various data structures.
5. Emphasize the programming concepts, how they work together which would be learning through meaning full examples.

LIST OF LAB PROGRAMMS

1. a) Write an Algorithm and flow chart to read the name and print the name
   b) Write an Algorithm and flow chart to add two numbers.
   c) Write an Algorithm and a flow chart to calculate area of square.
   d) Write Algorithm and flow chart to find the largest of two numbers.

2. a) Write a C Program to find the sum of individual digits of a positive integer.
   b) Write a C Program to find the roots of a quadratic equation.
   c) Write a C program to read in a three digit number produce following output (assuming that the input is 347)
      3 hundreds
      4 tens
      7 units
   d) Write a program to generate Fibonacci series

3. a) Write a C non recursive and recursive function for the following task
      i. Calculating Factorial
      ii. Swapping the values of two variable
      iii. Minimum/maximum value from the given input
      iv. Nth Fibonacci number
      v. GCD of a Given Number
   b) Write a C Program to Add, Subtract and Multiply Two Matrices Using Functions (Passing arrays as arguments to the function)
   c) Write a C program to determine if the given string is a palindrome or not

4.

a) Write a C Program to Insert a Substring into a Given Main String from a Given Position

b) Write a C Program to Delete n Characters from a Given Position in a Give String

5.

a) Write a program to swap two numbers using pointers.

b) Write a program to find sum of given array using pointers

6.

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

7.

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

8. Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

9. Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

10. Write a C program that uses functions to perform the following operations on single linked list:

i) Creation ii) Insertion iii) Deletion iv) Traversal

11. Write a C program that uses functions to perform the following operations on double linked list

i) Creation ii) Insertion iii) Deletion iv) Traversal

12. Write a C program that uses functions to perform the following operations on Circular linked list

i) Creation ii) Insertion iii) Deletion iv) Traversal

13. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort ii) Selection sort

14. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Quick sort ii) Merge sort

15. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search

16. Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 1

REFERENCE BOOKS:

1. P. Padmanabham, *"C programming and Data Structures"* , Third Edition, BS Publications
2. M.T. Somashekara, "*Problem Solving with C"*, PHI Learning Private Limited: New Delhi, 2012.
3. E. Karthikeyan, *"A Textbook on C Fundamentals, Data Structures and Problem Solving*," Prentice Hall of India Private Limited: New Delhi, 2008.

MCA I-Semester

14MC10122: IT & MANAGEMENT LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To train the student on:
   i. Identification of Functional parts of PC
   ii. Internet & WWW
   iii. Computer security issues and preventive measures
   iv. Operating Systems
   v. Financial accounting and management

II. To develop skills in assembling and disassembling PC, installation and un-installation of OS, Hardware and Software trouble shooting.

III. To apply knowledge and skills of IT to create word documents, excel spread sheets, power point presentations develop website and maintenance of PC.

COURSE OUTCOMES:

On completion of the course, a successful student will be able to:

1. Acquire skills in:
   i. Identification of Functional parts of PC
   ii. Internet & WWW
   iii. Computer security issues and preventive measures
   iv. Operating Systems
   v. Types of computer networks, connecting PC to the internet, web browsers, search engines, cyber hygiene
2. Design documents, excel spread sheets, power point presentations and personal websites effectively.
3. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and MS-Office.

LIST OF LAB PROGRAMMS

PC Hardware

1. a) Identify the peripherals of a computer, components in a CPU and its functions. Block diagram of CPU along with the configuration of each peripheral.

b) Demonstrating disassembling and assembling the PC back to working condition.

2. a) Introduction to Operating Systems, important of Operating System, components of OS, Installation of Microsoft Windows-XP Operating Systems.

b) Introduction to LINUX OS, Installation of LINUX OS. Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit.

C) **Hardware & Software Troubleshooting:** Diagnosis of PC malfunction, types of faults, common errors and how to fix them. Basic hardware & software troubleshooting steps, PC diagnostic tools

MS-Office

MS Word

3. Introduction to MS Word, importance of Word as Word Processor, overview of toolbars, saving, accessing files, using help and resources.

Create a word document using the features: Formatting fonts, drop cap, applying text effects, using character spacing, borders & shading, inserting headers & footers, using date & time option.

4. a) Create a word document in MS Word using the features: Inserting tables, bullets & numbering, changing text direction, hyperlink, images from files & clipart, drawing toolbar & word art.
b) Create an invitation using Mail Merge in MS Word.

MS Excel

5. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources.
Create a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
6. Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.

MS Power Point

7. a) Introduction to MS Power Point, utilities, overview of toolbars, PPT orientation, slide layouts, types of views.
Create a power point presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.
b) Create a power point presentation using the features: Auto content wizard, hyperlinks, Inserting images, clip art, audio, video, custom animation, slide hiding, tables and charts.

MS Publisher & World Wide Web

8. Introduction to MS Publisher, overview of toolbars, saving files, templates, layouts.
Create a website using the features: Home page, About us, Department, Contact page etc.

Internet & Computer Security

9. Search Engines & Cyber Hygiene: Introduction to computer networking, Bookmarks, Search toolbars & pop up blockers. Types of search engines & how to use search engines, Awareness of various threats on Internet, types of attacks & how to overcome. Installation of antivirus software, Configuration of personal firewall & Windows update on Computers.

MANAGEMENT LAB:

10. Create a Company in tally covering the different aspects of address, E-mail, tax numbers, Financial Years etc,The nature of the company's are:
a) Non-Trading b) Trading c) Manufacturing

11. From the following information create Accounts Groups under suitable Primary Accounts Groups in tally

Bills receivables	Accrued Incomes	Calls – in - Arrears
Prepaid Expenses	Outstanding expenses	Bills payables
Short term investments	Tangible assets	Intangibles assets
Shares on investments	Loans & Advances(Liability	Raw materials
Work – in – Progress	Loans & Advances from subsidiary (Secure.,)	Capital Reserves
Preliminary Expenses (Prim)	Deposits(liabilities)	Unclaimed Dividends

12. From the following information create Accounts Ledgers under suitable Accounts Groups in tally

Petty Cash A/c	Wages A/c	S.B.I A/c
Kishore Capital A/c	Building A/c	Furniture A/c
Good will A/c	Staff Welfare Expenses A/c	Traveling& Conveyance A/c
Salaries Expenses A/c	Trade Expenses A/c	Carriage Inwards Expe., A/c
Fuel & Oils Expenses A/c	Prepaid Insurance A/c	Accrued Wages A/c

A.B Equity Share Investments A/c	Excise Duty A/c	Customs Duty A/c
T.D.S A/c	T.C.S A/c	VAT A/c
Rent Receivable A/c	Provision for Bad debts A/c	Opening Stock A/c
Discount A/c (Cr.)	Land A/c	Office Car A/c
Goods Purchase A/c	Goods Sales A/c	Returns Inwards A/c
Returns Outwards A/c	Carriage Inwards A/c	Carriage Outwards A/c
Kishore Capital Reserve A/c	Plant & Machinery A/c	Provision Taxation A/c
Repairs & Maintenance A/c	Advertisement A/c	Rent Received A/c
Commission A/c (Cr.)	Interest A/c	Outstanding Salaries A/c
Depreciation A/c	Manufacturing Expe,. A/c	Ravi Salary Advance A/c
I.C.I.C.I Secu., Loan A/c	Prasad Unsecu., Loan A/c	Loss on sale of Machinery
Balu Enterprises a/c VJA (Cr.)	Chitra Enterprises A/c (Dr.)	Telephone Deposit A/c
Rent Received in Advance A/c	Bad debts A/c	Bank Charges A/c

13. From the following information create Accounts Ledgers under suitable Accounts Groups in tally **3 Periods**

Petty Cash A/c	Wages A/c	S.B.I A/c
Kishore Capital A/c	Building A/c	Furniture A/c
Good will A/c	Staff Welfare Expenses A/c	Traveling& Conveyance A/c
Salaries Expenses A/c	Trade Expenses A/c	Carriage Inwards Expe., A/c
Fuel & Oils Expenses A/c	Prepaid Insurance A/c	Accrued Wages A/c
A.B Equity Share Investments A/c	Excise Duty A/c	Customs Duty A/c
T.D.S A/c	T.C.S A/c	VAT A/c
Rent Receivable A/c	Provision for Bad debts A/c	Opening Stock A/c
Discount A/c (Cr.)	Land A/c	Office Car A/c
Goods Purchase A/c	Goods Sales A/c	Returns Inwards A/c
Returns Outwards A/c	Carriage Inwards A/c	Carriage Outwards A/c
Kishore Capital Reserve A/c	Plant & Machinery A/c	Provision Taxation A/c
Repairs & Maintenance A/c	Advertisement A/c	Rent Received A/c
Commission A/c (Cr.)	Interest A/c	Outstanding Salaries A/c
Depreciation A/c	Manufacturing Expe,. A/c	Ravi Salary Advance A/c
I.C.I.C.I Secu., Loan A/c	Prasad Unsecu., Loan A/c	Loss on sale of Machinery
Balu Enterprises a/c VJA (Cr.)	Chitra Enterprises A/c (Dr.)	Telephone Deposit A/c
Rent Received in Advance A/c	Bad debts A/c	Bank Charges A/c

14. Journalise from the following transactions in the books of M/s ZXY Ltd, for the month of October, 2006, and also generate the computerized Financial Statements in Tally (**Voucher Entry)**

Date	**Transactions**	**Amounts (Rs.)**
1,Oct,2006	Krishna started business with cash	65,000
4	Goods purchased for cash	14,000
5	Deposited into S.B.I, Tirupati	2,400
6	Goods sold for cash	18,000
10	Cash paid to Gopal	1,000
13	Goods purchased for cash	15,000
16	Goods sold to Narayana, Nellore	4,000
19	Purchased Furniture for cash	2,000
20	Received cash from Narayana, Nellore	750

24	Goods purchased from Sridhar, Hyderabad	2,000
28	Cash paid to Sridhar, Hyderabad	2,000
28	Withdrew from S.B.I, Tirupati	1,000
29	Withdrew from S.B.I, Tirupati for personal use	250
30	Paid for stationary	200
31	Paid Rent	500
31	Discount Received	700
31	Paid salaries	3,100

i. Which report will show the financial position of the company
ii. Name any 5 Accounting reports that can be displayed or printed in tally.

15. From the following information create **Inventory** in tally

16. From the following Trial balance of M/s AB&CO., prepare the Final Accounts (Trading and Profit & Loss A/c and also Balance Sheet) on 31st, March, 2010 in Tally

Trial Balance: Debit Balances (Rs.):Srinivasa Drawings Rs.4,500; Purchases Rs.20,000; Returns Inwards Rs.1,500; Stock (1-4-2005) Rs.8,000; Salary Rs.4,200; Wages Rs.1,200; Rent Rs.350; Bad debts Rs.400; Discount Rs.700; Sundry Debtors Rs.14,000; Cash in hand Rs.260; I.C.I.C.I Bank Rs.5,940; Insurance Rs.400; Trade Expenses Rs.300; Printing Rs.150; Furniture Rs.2000; Machinery Rs.5,000:
Credit Balances (Rs.): Srinivasa Capital Rs.24, 000; Sales Rs.30, 500; Discounts Rs.1, 900; Sundry Creditors Rs.10,000; Bills Payable Rs.2,500' **T.B Total :68,900**

Adjustments: 1.Closing stock was valued at Rs.7, 000; 2. Insurance was prepaid to the extent of Rs.60; 3. Outstanding liabilities were salary Rs.200 and wages Rs.200. 4. Make provision for doubtful debts at 5% on Sundry debtors. 5. Calculate interest on capital at 5% p.a. 6. Depreciate machinery at 5% and furniture at 10%. 7. Provide for discount on creditors at 1%

REFERENCE BOOKS:

1. ITL Education, "*Introduction to Information Technology,*" Pearson, 2nd Edition, 2005.
2. John Walken bach, "*Microsoft Office 2010 Bible,*" Wiley India Pvt. Ltd, 2010.
3. Peter Norton, "*Introduction to Computers,*" Tata McGraw-Hill, 7th edition, New Delhi 2012.
4. Vikas Gupta, "*Comdex Information Technology Course Tool Kit,*" WILEY Dreamtech, 2nd edition, New Delhi 2006.

MCA II-SEMESTER

14MC2BS01: PROBABILITY AND STATISTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To recognize the concepts of probability and probability distributions.
II. To develop skills in establishing, relationships between two or more characteristics through Correlation and regression analysis.
III. To analyze the problems in various fields of sciences by applying statistical tests and through statistical quality control charts.
IV. Apply knowledge of probability and probability distributions in various fields.

COURSE OUTCOMES:

On Successful completion of this course, student will be able to:

1. Assess the quality of the products produced in an industry using control charts.
2. Identify the association between variables using Correlation and Regression Analysis.
3. Apply tests of significance, for drawing valid inferences in research problems and making decisions in industry.

DETAILED SYLLABUS

UNIT-I: PROBABILITY AND RANDOM VARIABLES (14 Periods)

Probability and Random variables: Random experiment, event, sample space, definitions of probability, Addition and Multiplication theorems of probability, conditional probability, Bayes theorem. Mathematical expectation of a random variable and its Mean and Variance

Random Variables: Discrete and continuous random variables, probability mass function and probability density function of a random variable, distribution function and its properties, problems on random variable

UNIT-II: PROBABILITY DISTRIBUTIONS & STATISTICAL QUALITY CONTROL (14 Periods)

Probability Distributions: Binomial, Poisson, Normal Distributions - mean, variance and area property problems on N.D.

Statistical Quality Control: Construction of quality control charts $\overline{X}$, R, p, np and c-charts.

UNIT-III: CORRELATION AND REGRESSION ANALYSIS (7 Periods)

Correlation Analysis: Types of correlation, Karl Pearson's coefficient of Correlation and Spearman's rank correlation coefficient.
Regression Analysis: Fitting of two lines of regression, regression coefficients.

UNIT-IV: SAMPLING DISTRIBUTIONS, ESTIMATION AND TEST OF SIGNIFICANCE FOR LARGE SAMPLES (11 Periods)

Sampling Distribution and Estimation : Population, sample, parameter, statistic, sampling distribution of sample mean and sample S.D, standard error of a statistic, point and interval estimation.

Test of Significance for Large Samples: Null and alternative hypothesis, type-I and type-II errors, level of significance, one tailed and two tailed tests, large sample test for proportions, large sample tests for means.

UNIT-V: TEST OF SIGNIFICANCE FOR SMALL SAMPLES (9 Periods)

Tests of Significance for Small Samples: Student's t-test: one sample mean and two sample means; chi-square test of goodnss of fit and independence of attributes; F-test for equality of two population variances.

Total Periods: 55

TEXT BOOKS:

1. T.K.V.Iyengar, B. Krishna Gandhi ,et.al, "Probability and Statistics," S.Chand and Company LTD: New Delhi, 3rd Edition,2011.
2. S.C. Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics," Sultan Chand and Sons, 11th Edition, 2005.
3. S.C. Gupta and V.K. Kapoor, "Fundamentals of Applied Statistics," S. Chand and Sons: New Delhi, 2010.

REFERENCE BOOKS:

1. Shanaz Bhatul, "Text book of Probability and Statistics," RIDGE Publications, 2nd Edition
2. Richard A. Johnson, "Probability and Statistics for Engineers," Prentice Hall of India, 7th Edition,2010.
3. P.Kandasamy, K.Thilagavathi and K.Gunavathi, "Probability Statistics and Queueing Theory," S.Chand and Company Ltd.; Newdelhi, Reprint-2007.

MCA II-Semester

14MC20101: OPERATING SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSEOBJECTIVES:

I. To provide basic concepts of operating system and understand the services of operating system.
II. To train the students in solving critical section problem, scheduling algorithms.
III. To develop the scheduling and page replacement algorithms.

COURSEOUTCOMES:

On successful completion of this course the students will be able to:

1. Understand the importance of operating system.
2. Identify the performance of various CPU scheduling algorithms.
3. Design and evaluate solutions for handling process synchronization and deadlock problems.
4. Communicate effectively with operating system through application programs.

DETAILED SYLLABUS:-

UNIT-I: INTRODUCTION TO OPERATING SYSTEM STRUCTURES (10 periods)

Introduction: Role of operating system**,** Computer system organization, Computer System Architecture, Operating system structure, operating system operations, Distributed systems, Special purpose systems, Computing environments, open source operating systems.

System Structures: Operating-system services, user operating system interface, System calls, types of system calls, System programs, Operating System design and implementation, Operating system structure, virtual machines.

UNIT-II: PROCESSES, THREADING AND PROCESS SCHEDULING (12 Periods)

Processes: Process concept, Process scheduling, Operations on processes, Interprocess communication, Examples of IPC systems.

Multithreaded Programming: Overview, Multithreading models, threading issues.

Process Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, Multiple-processor scheduling, algorithm evaluation.

UNIT-III: SYNCHRONIZATION AND DEADLOCKS (11 periods)

Synchronization: Background, The Critical-section problem, Peterson's Solution, Synchronization hardware, Semaphores, classic problems of Synchronization, Critical regions, Monitors.

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT-IV: MEMORY MANAGEMENT (11 periods)

Memory Management strategies: Background, Swapping, Contiguous memory allocation, Paging, Structure of page table, Segmentation.
Virtual Memory Management: Background, Demand paging, Copy on write, Page replacement, Allocation of frames, Thrashing, Other considerations.

UNIT-V: SYSTEM PROTECTION, RECOVERY AND FAULT TOLERANCE (10 periods)

System Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, The Security problem, Program threats, System and Network Threats.
Recovery and Fault Tolerance: Faults, Failures and Recovery, Byzantinefaults and Agreement protocols, Recovery, Fault Tolerance Techniques, Resiliency.

Total Periods: 54

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "*Operating System Concepts*," 8thEdition, John Wiley and Sons, 2010.
2. D.M Dhamdheere, "*Operating Systems: A concept-Based Approach*," Second edition, Tata McGraw-Hill Companies, Second edition, 2006.

REFERENCE BOOKS:

1. Achyut S. Godbole, "*Operating Systems*," 2nd Edition, Tata McGraw-Hill, 2005.
2. William Stallings, "*Operating Systems: Internals and Design Principles*," 6thEdition, Pearson Education, 2008.

MCA II-Semester

14MC20102: OBJECT ORIENTED PROGRAMMING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
A course on "Programming Through C"

COURSE OBJECTIVES:

I. To recognize the basics and principles of Object Oriented Programming in Java environment.
II. To become skilled at Advanced GUI components from the Swing set of GUI components including panels, frames, text areas and many more.
III. To integrate robustness, reusability, and portability into large-scale software development.

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

1. Perform basic, computational tasks easily and effectively.
2. Analyze and design a computer programs to solve real world problems based on object-oriented principles.
3. Show competence in the use of java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
4. Write simple GUI interfaces for a complex task to interact with users, and to understand the event-based GUI handling principles.
5. Work with computing community using Object Oriented Programming concepts towards developing quality software applications.

DETAILED SYLLABUS:-

UNIT-I: OBJECT ORIENTED PROGRAMMING (OOP) (11 periods)

Object Oriented Programming (OOP): Programming paradigms, Difference between OOP and Procedure Oriented Programming, OOP principles, encapsulation, inheritance and polymorphism.
Introduction to Java Programming: Features of Java, Comparing Java and other languages, Basics of Java programming, Java program structure, Java buzzwords, JVM and JRE architecture, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, type conversion and casting, Overloading, Math class, Arrays in java.

UNIT-II: OBJECTS AND CLASSES (10 periods)

Objects andClasses: Basics of objects and classes in java, Introducing methods, types of methods: static, non-static methods. Usage of static with data and methods, usage of final with data, methods and classes, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing: call-by-value, recursion, nested classes and inner classes, wrapper classes, Object class.
String Handling: character extraction, modifying a string, data conversion usingvalueOf(), String Buffer, StringBuilder.

UNIT-III: INHERITANCE AND POLYMORPHISM (10 p*eriods*)

Inheritance and Polymorphism: Basic concepts, member access rules, usage of super keyword, forms of inheritance, method overloading, method overriding, abstract classes, dynamic method dispatch, using final with inheritance.

Interface: Basic concept, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Differences between classes and interfaces

Package: Defining, creating and accessing a package, understanding CLASSPATH, importing packages, classes and interfaces of util package: Vector, Date, StringTokenizer, Formatter, Scanner, and Random.

UNIT-IV: EXCEPTION HANDLING AND MULTITHREADING (12 periods)

Exception Handling and Multithreading: Concepts of exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes.

Multithreading: Concepts of multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface, synchronization, thread priorities, daemon threads.

Managing I/O Files in Java: Concepts of streams, using streams, stream classes: Byte stream, Character stream, using streams, using the File class, I/O exceptions, creation of files, reading/writing characters and Bytes, concatenating and buffering files, random access files, Serialization, reading and writing objects to file.

UNIT-V: GUI PROGRAMMING WITH JAVA (12 p*eriods*)

GUI Programming with Java: Abstract Window Toolkit **(AWT)**: AWT Classes, Windows Fundamentals, Working with Windows, Frames, Graphics and Texts – AWT Controls – Layout Managers – Menus.

Swings: Introduction to swings, hierarchy of swing components, containers: top-level containers, JFrame,JWindow, JDialog, light weight containers, JPanel, overview of several swing components: JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, JTable, JTree, JTabbedPanes, JScrollPanes, JApplet.

TOTAL PERIODS: 55

TEXT BOOK:

1. Herbert Schildt,"*The Complete Reference Java J2SE*,"Tata McGraw Hill, 7th Edition, 2006.

REFERENCE BOOKS:

1. B.Eswar Reddy, T.V.Suresh Kumar and P.Ragavan, "*Object Oriented Programming with Java*," Pearson Sanguine Publications, 2nd Edition, 2011.
2. H.M.Dietel and P.J.Dietel, "*Java How to Program*," Pearson Education/PHI, 5th Edition, 2009.

MCA II- Semester

14MC20103: DATABASE MANAGEMENT SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To offer basic knowledge in the design and implementation of database system.
II. To be aware of database concepts such as integrity constraints, concurrency control and recovery management.
III. To develop skills in querying, updating and managing the database system.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Apply knowledge of transactional processing system for recovering system from crash.
2. Identify normalization techniques for the development of software applications to realistic problems.
3. Design an application system using Entity-Relationship(ER) diagrams.
4. Learn and apply Structured Query Language (SQL) for database definition and manipulation.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO CONCEPTUAL MODELLING, DATABASE CONCEPTS AND ARCHITECTURE (10 Periods)

Introduction and Conceptual Modeling: **Databases and Database Users:** Introduction, Characteristics of Database Approach, Actors on the Scene, Workers defining the Scene, Advantages of using DBMS Approach.
Database System-Concepts and Architecture: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Language and Interfaces, The Database System Environment- DBMS component modules, database system utilities, Tools, application environments and communication facilities.

UNIT- II: INTRODUCTION TO DATABASE DESIGN AND RELATIONAL MODEL (12 Periods)

Introduction to Database design: Database design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises
Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /altering Tables and Views.

UNIT – III: BASIC SQL QUERY & INTRODUCTION TO SCHEMA REFINEMENT (12 Periods)

Form of Basic SQL Query: Examples of Basic SQL Queries, Nested queries: Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators,

Aggregate Operators, NULL values :Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL, Triggers and Active Data bases.
Introduction to Schema Refinement: Problems Caused by redundancy, Decompositions, Problem related to decomposition, Functional Dependencies, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition.

UNIT- IV: OVERVIEW OF TRANSACTION MANAGEMENT, CRASH RECOVERY AND CONCURRENCY CONTROL (11 Periods)

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Performance of Locking.
Crash recovery: Introduction to ARIES, the Log, Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.
Concurrency Control: 2PL, Serializability and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks.

UNIT V: OVERVIEW OF STORAGE AND INDEXING (10 Periods)

Overview of Storage & Indexing: Data on External Storage – File Organization & Indexing – Index Data Structures.
Storing Data: The Memory Hierarchy: Magnetic disks, Performance implications of disk structure - Redundant Arrays of Independent Disks.
Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TOTAL PERIODS: 55

TEXT BOOKS:

1. Raghu Ramakrishnan and Johannes Gehrke , "*Data base Management Systems*," 3rd Edition, Tata McGraw-Hill,2003.
2. Ramez Elmasri, Shamkant B. Navathe, Durvasula V.L.N. Somayajulu and Shyam K. Gupta, "*Fundamentals of Database Systems*," 4th edition, Pearson education, 2008.

REFERENCE BOOKS:

1. A.Silberschatz,H.F. Korth, S.Sudarshan, "*Data base System Concepts*," McGraw hill, VIth edition,2006.
2. C.J.Date, "*Introduction to Database Systems*," Pearson Education, 7th edition,2004.
3. M. L. Gillenson, "*Fundamentals of Database Management Systems*," Wiley Student Edition.
4. Peter Rob, A. Ananda Rao and Carlos Coronel, "*Database Management Systems*," Cengage Learning, 2008.

MCA II – Semester

14MC20104: SOFTWARE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

1. To understand the importance of software engineering process and total quality management during the development of application software.
2. To enhance the development of software application by focusing on Agile Development, Architectural Design**,** COCOMO, Software Testing and Risk Management.
3. To provide a road-map for the development team and end-users of an application software.

COURSE OUTCOMES:

After completion of the course, a successful student able to:

1. Understand the different Software models and basic concepts of a Software Engineering.
2. Formulate and solve various problems by adopting appropriate methods like requirements elicitation and analysis, COCOMO, RMMM Plan during the development of application software.
3. Design and develop a component/ an entire application software by making use of Agile process Model.
4. Demonstrate the knowledge of understanding by making use of an appropriate process model for the development of application software.
5. Communicate effectively with all the stakeholders of software systems function appropriately on multi-disciplinary teams.
6. Improve the software quality and software testing methodologies.

DETAILED SYALLABUS:-

UNIT-I: SOFTWARE, SOFTWARE ENGINEERING, AND PROCESS (10 periods)
The nature of Software, The unique nature of WebApps, Software engineering- A layered technology, A Generic process model , Process assessment and improvement, Forward Engineering , Reengineering, Reverse Engineering , CMMI, Software myths.

UNIT-II: PROCESS MODELS AND SOFTWARE REQUIREMENTS (13 periods)
Process Models: Prescriptive process models: The waterfall model, Incremental Process Model: The RAD Model. Evolutionary process models: Prototyping, The Spiral Model , The Unified Process; Phases of the Unified Process, agile development: Agile process, extreme programming. The Unified process, Scrum process.
Software Requirements: Introduction to functional and non-functional requirements, User requirements, System requirements, Interface specifications, the software requirement document, Requirements elicitation and analysis.

UNIT-III: ANALYSIS AND DESIGN MODEL (10 periods)

Analysis Concepts: Data Dictionary, Entity-Relationship Diagrams, Data Flow Diagrams.
Design Concepts: Software design quality guidelines and attributes, Design model.
Architectural Design: Architecture and its importance, Architectural Styles, Architectural design, Architectural mapping using data flow.

UNIT-IV: PERFORMING USER INTERFACE DESIGN AND SOFTWARE TESTING (10 periods)

Performing User Interface Design: Golden rules, User interface analysis and design, interface analysis, interface design steps.
Self Directed Learning: Designing of a Screen Mock for Student Information System.
Software testing strategies: Software testing fundamentals, A strategic approach to software testing, Test strategies: Unit testing and integration testing, System Testing and User Acceptance Testing (UAT)), Design test cases.

UNIT-V: RISK MANAGEMENT, MAINTENANCE, RE-ENGINEERING AND ESTIMATION (9 periods)

Risk management: Reactive versus Proactive Risk strategies, RMMMPlan.
Maintenance and reengineering: Software maintenance, software supportability, reengineering.
Empirical Estimation Models: Structure of Estimation Models, COnstructiveCOstMOdel, Software Equation.

TOTAL PERIODS: 52

TEXT BOOKS:

1. Roger S. Pressman, *"Software Engineering A practitioner's Approach*," 7thEdition, McGraw-Hill,2010.
2. Sommerville, *"Software Engineering*," 8thEdition,Pearson education, 2007.

REFERENCE BOOK:

1. K.K. Agarwal and YogeshSingh*, "Software Engineering,"* New Age International Publishers.

MCA II- Semester

14MC2HS01: PROFESSIONAL ETHICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To inculcate fundamental concepts of Engineering Ethics, Professional Values and Social Responsibility
II. To provide skills in discharging the professional responsibilities as managers, advisors and leaders
III. To apply codes of ethics in workplace
IV. To inculcate a sense of responsibility and safety of others without compromising on ethical issues

COURSE OUTCOMES:
On successful completion of this course the students will be able to:-

1. Apply the principles of ethics to solve engineering problems.
2. Analyze the problems in the implementation of moral autonomy and resolve through consensus.
3. Practice professionalism in Engineering and assess the issues pertaining to moral dilemmas
4. Implement the principles of ethics while discharging duties
5. Responsible to follow the codes of ethics
6. Function as a member, consultant, Manager, Advisor and Leader in multi-disciplinary teams
7. Write reports without bias and give instructions to follow ethics
8. Demonstrate the expertise in managing the projects in multidisciplinary environments
9. Recognize the importance of ethics in profession for lifelong learning

DETAILED SYLLABUS:-

UNIT-I: ENGINEERING ETHICS (10 periods)

Scope and Aim of Engineering Ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory, Gilligan's theory, Consensus and Controversy,

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES (11 periods)
Theories about Virtues, Professions, Professionalism – characteristics, expectations, Professional Responsibility, Integrity, Self-respect, Sense of "Responsibility". Self-interest, Customs and Religion- Self-interest and Ethical Egoism, Customs and Ethical Relativism, Religion and Divine Command Ethics. Use of ethical theories- resolving moral dilemmas and moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION (12 periods)

Engineering as experimentation- Similarities to standard experiments, learning from the past and knowledge gained. Engineers as Responsible Experimenters-Conscientiousness, moral autonomy and accountability. The challenger case, codes of ethics and limitations. Industrial standards, problems with the law of Engineering.

UNIT-IV: RESPONSIBILITIES AND RIGHTS (12 periods)

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, the bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES (10 periods)

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Consultants, Witnesses, Advisors and Leaders. Engineers as Managers – Managerial ethics applied to Engineering Profession, moral leadership.

TOTAL PERIODS: 55

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, Ethics in Engineering, Tata McGraw-Hill, 3rd edition, 2007.
2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Engineering Ethics, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, Human Values and Professional Ethics, Taxmann Allied Services Pvt Ltd., 2009.
2. Edmund G. Seebauer and Robert L. Barry, Fundamental of Ethics for Scientists and Engineers, Oxford University Press, 1st edition, 2001.
3. Charles F. Fledderman, Engineering Ethics, Pearson Education, 2004.
4. R. Subramanaian, Professional Ethics, Oxford Higher Education, 2013.

MCA II-SEMESTER

14MC20121: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
A Course on "Programming Through C"

COURSE OBJECTIVES:

I. To understand the basics and principles of Object Oriented Programming in Java environment.
II. To study Advanced GUI components from the Swing set of GUI components including panels, frames, text areas and many more.
III. To integrate robustness, reusability, and portability into large-scale software development.

COURSE OUTCOMES:

After the completion of the course, a successful student will be able to:

1. Perform basic, computational tasks easily and effectively.
2. Analyze and design a computer programs to solve real world problems based on object-oriented principles.
3. Show competence in the use of java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
4. Write simple GUI interfaces for a complex task to interact with users, and to understand the event-based GUI handling principles.
5. Work with computing community using Object Oriented Programming concepts towards developing quality software applications.

LIST OF LAB PROGRAMS

1. Practical knowledge about installation of JDK, environmental variable settings and Know about java compiler and interpreter.

2. a) Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.
   b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it.
   c) Write a Java program to find both the largest and smallest number in a list of integers.

3. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
   b) Write a Java program to multiply two given matrices.

4. a) Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.
   b) Demonstrate method overloading and constructor overloading.
   c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

5. a) Write a Java program to sort a list of names in ascending order.
   b) Write a Java program to implement the matrix ADT using a class.The operations supported by this ADT are:
      a) Reading a matrix. c) Addition of matrices.
      b) Printing a matrix. d) Subtraction of matrices.
      e) Multiplication of matrices.

6. Write a Java Program that uses a recursive function to compute NcR. (Note: n and r values are given.)

7. Write a Java program to perform the following operations:
   a) Read line of Text and make word cap.
   b) Read a line of text and count number of vowels and consonants.

8. a) Write a Java program that makes frequency count of letters in a given text.
   b) Write a Java program that uses functions to perform the following operations:
      i) Inserting a sub-string in to the given main string from a given position.
      ii) Deleting n characters from a given position in a given string.

9. a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
   b) Write a Java program to make frequency count of words in a given text.

10. Write a Java program that illustrates the following:
    a) Creation of simple package.
    b) Accessing a package.
    c) Implementing interfaces.

11. Write a Java program that illustrates the following:
    a) Handling predefined exceptions
    b) Handling user defined exceptions

12. a) Write a Java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
    c) Write a Java program that displays the number of characters, lines and words in a text file.

Note: Filename, number of the byte in the file to be changed and the new character is specified on the command line.

13. a) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
    b) Write a java program to demonstrate various GUI components in java (AWT) with appropriate Event Handling.
    c) Write a Java program that creates a user interface to perform integer divisions.

The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box. (Using SWINGS)

REFERENCE BOOKS:

1. www.java2s.com
2. www.roseindia.com
3. www.tutorialspoint.com
4. Department Lab Manual.

MCA II-Semester

14MC20122: DATABASE MANAGEMENT SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To provide basic knowledge in the design and implementation of database schema for a given problem.
II. To be aware of database concepts such as entity integrity constraints, domain integrity constraints, referential integrity constraints etc.,
III. To develop skills in querying, updating and managing the database system.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Impart knowledge in applying normalization techniques for development of application software to realistic problems.
2. Formulate queries using SQL DDL/DML/DCL commands.
3. Design a database using ER diagrams, convert ER diagrams into relation schemas.
4. Exploit their knowledge in developing database applications using SQL language.
5. Implement procedural programming using PL/SQL language.

LIST OF LAB PROGRAMMS

1. Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, foreign keys and if any.
2. Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

3. Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multivalued, and Derived) have different way of representation.

4. Creation of tables, altering the tables, dropping tables truncate and rename tables etc.

5. Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies.

   For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when

the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only

6. Work on simple queries to access data from tables using SELECT statement and WHERE condition. Also perform insert, update, delete and retrieve data from the database.

7. Practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING clauses.

8. Practice String functions: Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr **Datefunctions:** Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round **Conversion functions:** To_char, to_number and to_date.

9. Practice queries on Defining Views, Creating Views, Using Views to Change Data, Dropping Views, creating Indexes and sequences.

10. Practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

11. Practice queries using Joins (equi joins, non equi-joins, outer joins: Left outer joins, Right outer joins etc.,)

12. a) Creation of simple PL/SQL program using declaration, executable and exception handling sections.

    b) Creation of PL/SQL programs using Cursors.

13. Work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

14. Learn the procedure for creating packages and develop applications that reference its types, call its subprograms, use its cursor, and raise its exception.

REFERENCE BOOKS:

1. Dr. P. S. Deshpande, "*SQL & PL/SQL for Oracle 10g Black Book*," Dreamtech Press,2007.
2. Ivan Bayross, "*SQL, PL/SQL The Programming Language of ORACLE,*" BPB Publications, 2002.
3. J. J. Patrick, "*SQL Fundamentals*,"2nd edition, Pearson Education, 2002.
4. Rick F. Vander Lans, *"Introduction to SQL*," 4th edition, Addison-Wesley Professional, 2007.

MCA III – Semester

14MC3HS01: ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCE MANAGEMENT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To impart basic concepts of organizational behavior, Human Resource Management.
II. To develop skills related to planning and management of Human Resources.
III. To apply the concepts & theory of personality for effective Human Resource Management.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Gain Knowledge in
    a. Managerial Concepts of Organizational Behavior.
    b. Managerial Skills of Human Resource Management.
2. Develop skills of effective Human Resource Management.
3. Application of concepts and theories for optimum utilization of Human Resource.
4. Inculcates ethical principles and commitment to Professionalism.
5. Develops effective communication among the work group of an Organization.
6. Enriches empathy and enables lifelong human relations.
7. Provides a platform to emerge as a responsible individual in an Organization.
8. Provides life skills for effective operation of an organization.
9. Appreciate the significance of Human Resource Management in lifelong learning for knowledge and skill development

DETAILED SYLLABUS

UNIT–I: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR (10 periods)

Introduction to organization -Concepts of organization - meaning of Organizational Behavior(OB), characteristics of OB, role of OB, approaches to the study of OB.

UNIT-II: PERSONALITY, PERCEPTION AND LEARNING (10 periods)

PERSONALITY: concept, determinants of personality, theories of personality, Organizational applications of personality.

PERCEPTION: Process of perception, inter personal perception, managerial applications of perception.

LEARNING: Components of learning process, Importance of learning, Factors affecting learning

UNIT-III: INTRODUCTION TO HRM (10 periods)

Functions and objectives of HRM

HR PLANNING: Nature and importance of HRP, factors affecting HRP, HRP Process

JOB ANALYSIS: Nature, Process of job analysis, Job Analysis and Competitive Advantage.

RECRUITMENT & SELECTION: Nature and importance of recruitment, recruitment process, selection process, barriers to effective selection.

UNIT-IV: INDUCTION, TRAINING AND PERFORMANCE APPRAISAL (10 periods)

INDUCTION: Induction, Orientation Programme, Problems of Orientation

TRAINING: Nature of training and development, gaps in training, the training process, training methods, training for career development

PERFORMANCE APPRAISAL: Managing Performance, Appraisal Process, Job Evaluation Process, Methods of Evaluation

UNIT-V: REMUNERATION, EMPLOYEE PARTICIPATION AND CONTEMPORARY ISSUES (10 periods)

REMUNERATION: Components of Remuneration, Factors influencing employee remuneration-Incentives, Types of incentives-Incentive Schemes-Employee Benefits and Services

EMPLOYEE PARTICIPATION: Empowering employees through participation-Importance and Limitations

CONTEMPORARY ISSUES: HR BPO, Call Centers, Work Life Balancing, HR Ethics, Working in cross cultural teams –Need and Challenges-Cultural Shock and Reverse Cultural Shock

TOTAL PERIODS: 50

TEXT BOOKS:

1. L.M.Prasad, *Organizational behavior*, 4th Edition, Sultan Chand and Sons', 2006. ISBN: 8 1-8054- 478-8

2. Prof. K. Aswathappa, *Human resource management, text and cases*, 7th Edition , McGraw Hill Publishing company Ltd., 2013, ISBN: 9781259026829

REFERENCE BOOKS:

1. Fred Luthans, *Organizational behavior*, 10th Edition, McGraw Hill Higher Education, 2011. ISBN : 9780071111584

2. Shashi K. Gupta and Rosy Joshi, *Organizational Behavior*, 4th Edition, Kalyani Publications, 2008 ISBN: 9788127238988

3. P. Subba rao, *Personnel and Human resource management*, 4th Edition, Himalaya Publishing House Pvt. Ltd., 2009.

MCA III-SEMESTER

14MC3BS01: OPERATIONS RESEARCH

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To create awareness, about optimization in utilization of resources**.**
II. To understand nuance of project management through operational models.
III. To apply Operations research techniques like Linear Programming Problems, Transportation problem, Assignment problem, Replacement problem and PERT/CPM in Research and Industrial operations.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Apply the knowledge of Linear Programming Problem, Transportation Problem, Assignment Problem, Inventory models PERT/CPM etc., in the fields of business research and industry.
2. Solve complex computational problems using Linear Programming Problem(LPP).
3. Analyze and design the data, to synthesize transformation by using operational models like Transportation Problem, Assignment Problem, Sequencing Problem etc.,

DETAILED SYLLABUS:-

UNIT-I: INTRODUCTION TO OPERATIONS RESEARCH AND LPP (10 Periods)

Introduction to OR: Introduction, modeling in OR- Phases of OR study.

Linear Programming: Formulation of LPP, Graphical solution of LPP, Simplex method, Artificial variable technique-Big M-method.

UNIT-II: TRANSPORTATION AND ASSIGNMENT PROBLEM (12 Periods)

Transportation Problem: Finding an initial basic feasible solution using North-West corner rule, Least cost Entry method, Vogel's Approximation Method. Degeneracy in Transportation Problem, Optimality test- MODI method Unbalanced Transportation Problem.

Assignment Problem: Hungarian method of Assignment Problem, Traveling salesman Problem and its restrictions.

UNIT-III: SEQUENCING PROBLEM AND REPLACEMENT PROBLEM (10 Periods)

Sequencing Problem: Optimal solution for processing n-jobs through two machines, n-jobs through three machines.

Replacement Problem: Introduction, Replacement of items that deteriorate when money value is constant and variable- Individual Replacement policy and group Replacement policy.

UNIT-IV: THEORY OF GAMES (10 Periods)

Theory of Games: Introduction, , types of games, Optimal strategy, Maxmin-Minimax Principle, solution of games with saddle point, Rectangular games without saddle point, principle of dominance, graphical method for 2xn and mx2 games.

UNIT-V: INVENTORY MODELS AND PROJECT MANAGEMENT BY PERT/CPM

(13 Periods)

Introduction of Inventory – Reasons for maintaining Inventory, Types of inventory costs, Deterministic Inventory Models: EOQ Models with and without shortages, Purchasing and Manufacturing Models with and without shortages,

Project Management by PERT/CPM**:** Basic steps in PERT/CPM technique, rules of drawing network diagrams, Fulkerson's rule: Critical Path Method (CPM), Programme Evaluation and Review Technique (PERT).

Total Periods: 55

TEXT BOOKS:

1. S. D. Sharma, "Operations Research," Kedar Nath Ram Nath and Company: India, 15th Edition,2006-07.
2. S. Kalavathy, "Operations Research," Vikas Publishing House Pvt.Ltd, 2nd Edition, 2007.
3. Prem Kumar Gupta and D.S. HIRA, "Operations Research," S.Chand and Company Ltd.: New Delhi, 2008.

REFERENCE BOOKS:

1. P.K. Gupta and Man Mohan, "Problems in Operations Research," Sultan Chand and Sons:New Delhi,2007
2. Hamdy A. Taha, "Operations Research," 8th Edition, Pearson Publications, 2007.
3. J.K. Sharma, "Operations Research Theory and Applications," 4th Edition, Mc Millan India Ltd.

MCA III – Semester

14MC30101: OBJECT ORIENTED ANALYSIS AND DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
Courses on "Object Oriented Programming Through JAVA" and "Software Engineering"

COURSE OBJECTIVES:

I. To understand the principles of object orientation.
II. To understand the behavior of an Application Software before deployment by using State Chart Diagrams.
III. To analyze logical, behavioral and architectural models and apply for real world applications.

COURSE OUTCOMES:

After successful completion this course, the student will be able to:

1. Acquire the principles of Object Oriented Development.
2. Recognize the elements of Class, Use case, Activity, Sequence and State, diagrams and develop models using them.
3. Design the domain and application artifacts to construct the Logical, Behavioral and Architectural model of an Application Software.
4. Make use of UML Tool, Rational Rose to design Class, Use Case, Sequence, Collaboration, Activity, State Chart, Component and Deployment Diagrams for the an Application Software.
5. Communicate effectively with all the team members about various logical and behavioral objects of an Application Software.

DETAILED SYLLABUS:-

UNIT -I: INTRODUCTION TO UML (10 Periods)

The meaning of Object Orientation, object identity, Importance of modeling, principles of modeling, object oriented modeling, An overview of UML, conceptual model of the UML, Architecture.
Classes - Terms and concepts, Common Modeling Techniques.
Relationships - Modeling simple dependencies, single Inheritance and structural relationships, Common Mechanisms and UML Diagrams.

UNIT-II: STRUCTURAL MODELING (12 Periods)

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.
Class Diagrams - Terms, concepts, Modeling techniques for Class Diagram, Modeling Simple collaboration, Logical database Schema, Forward and Reverse Engineering.
Object Diagrams – Modeling object structures, Forward and Reverse engineering.

UNIT-III: BASIC BEHAVIORAL MODELING (11 Periods)

Use cases - Terms and Concepts, Common Modeling techniques.
Use case Diagrams - Terms and Concepts, Common Modeling Techniques.

Sequence Diagrams - Terms and Concepts, Modeling flows of control by time ordering; **Collaboration Diagrams –** Terms and Concepts, Modeling flows of control by Organization, Forward and Reverse Engineering.

UNIT-IV: ADVANCED BEHAVIORAL MODELING (11 Periods)

Activity Diagrams - Terms and Concepts, Modeling a workflow, Modeling an operation, Forward and reverse Engineering.

Events and Signals, State Machines, State Chart Diagrams – Modeling Reactive Objects.

UNIT-V: ARCHITECTURAL MODELING (8 Periods)

Component, Deployment, **Component Diagrams** – Terms and Concepts, Modeling Source Code, Modeling Physical Database, Forward and Reverse Engineering; **Deployment Diagrams** – Terms and Concepts, Modeling Embedded System, Modeling Distributed System, Forward and Reverse Engineering.

Total Periods: 52

TEXT BOOK:

1. Grady Booch, James Rum Baugh and Ivar Jacobson, *"The Unified Modeling Language User Guide,"* Pearson Education, 1999.

REFERENCE BOOKS:

1. John W. Satzinger, Robert B Jackson and Stephen D Burd, *"Object-Oriented Analysis and Design with the Unified Process,"* Cengage Learning, 2004.

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, *"UML 2: Toolkit,"* Wiley India Pvt. Ltd., 2004.

MCA III – Semester

14MC30102: DATA WAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
A course on "Data Base Management Systems"

COURSE OBJECTIVES:

I. To understand the concepts of Data Warehouse system, Data Warehouse system architecture, data mining principles and techniques.
II. To analyze and demonstrate data mining algorithms like Apriori, FP-growth, k-mediod and gaining better understanding of business trends.
III. To be relevant in applying critical thinking, problem-solving, and decision-making skills effectively.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

1. Understand the role of data warehouse, architecture and its support for quality data.
2. Ability to identify the association rules, classifying by using decision tree algorithms and clustering large data sets using k-mediods, k-means, etc.
3. Design and implement Hierarchical Methods-Agglomerative clustering, divisive hierarchical clustering and Classification by Decision Tree to perform proactive analysis, predictive modeling, and identifying new trends and behaviors.
4. Investigate preprocessing of data and apply mining techniques on it.
5. Apply data mining algorithms like Apriori, FP-Growth, DBScan,etc,. and evaluate results for simple data sets.

DETAILED SYLLABUS:-

UNIT-I: INTRODUCTION AND DATA WAREHOUSE COMPONENTS (10 periods)

Introduction: The need for Data Warehousing, Paradigm Shift, Business Problem Definition, operational and informational Data Stores, Data Warehouse Definition and Characteristics, Data Warehouse Architecture.
Data Warehouse Components: Overall Architecture, Data Warehouse Database, Sourcing, Acquisition , Cleanup and Transformation tools, meta data, data marts, Data Warehouse Administration and Management .

UNIT-II: BUILDING A DATA WAREHOUSE AND INTRODUCTION TO DATA MINING (12 periods)

Building A Data Warehouse: Business Consideration, Design considerations, Technical considerations, Implementation considerations, integrated solutions, Benefits of Data Warehousing, Multidimensional Data Model-From tables and spread sheets to Data Cubes & Star, Snowflake and fact constellation Schemas
Introduction To Data Mining: Motivated Data Mining, Definition of Data Mining, Data Mining-On What Kind of Data?, Data mining Functionalities, classification of Data mining systems, Data mining primitives, Integration of Data mining Systems with a Database or Data Warehouse System, Major issues in Data Mining.

UNIT-III: DATA PREPROCESSING AND ASSOCIATION RULE MINING
(11 periods)

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.
Association Rule Mining: Attribute Oriented Introduction, Mining Frequent Patterns, Associations and Correlations- Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation.

UNIT-IV: CLASSIFICATION AND CLUSTERING (11 p*eriods)*

Classification: Definition of classification, Definition of prediction, issues in classification and prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation.
Clustering: Introduction to cluster Analysis**,** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS

UNIT-V: ADVANCES IN CLUSTERING, MULTIMEDIA, TEXT & WEB DATA MINING AND APPLICATIONS (11 p*eriods)*

Advances in Clustering: Hierarchical Methods**-**Agglomerative and divisive hierarchical clustering, Constraint-Based Cluster Analysis, Outlier Analysis.
Multimedia, Text and Web Data Mining: Multimedia Data Mining, Text Mining, Mining the World Wide Web.
Data Mining Applications: Financial data Analysis, Retail Industry, Telecommunication Industry.

Total Periods: 55

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, "*Data Mining–Concepts and Techniques*," 2nd Edition, Morgan Kaufmann Publishers, 2006

2. Berson Alex and Stephen J Smith, "*Data Warehousing, Data Mining and OLAP,"* Tata McGraw-Hill, 2004.

REFERENCE BOOKS:

1. Ralph Kimball, Margy Ross, Warren Thornthwaite and Joy Mundy, Bob Becker, "*The Data Warehouse Life cycle Tool kit,"* 2nd edition, John Wiley & Sons Inc, 2007.

2. William H Inmon, "*Building the Data Warehouse,*" 4th edition, John Wiley & Sons Inc, 2005.
3. Arun K Pujari, "*Data Mining Techniques,*" 2nd edition, Universities Press(India)Pvt. Ltd, 2001.

MCA III-Semester

14MC30103: COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To acquire basic knowledge of network components, topologies, network models, protocols and algorithms.
II. To comprehend in-depth knowledge about the communication technologies like Domain Name Service, E-mail.
III. To analyze techniques in designing network applications.

COURSE OUTCOMES:

After successful completion of the course, the student able to

1. Understand the concept of networks, different topologies, network devices and OSI reference model.
2. Analyze Error detection and correction mechanisms to verify correct data.
3. Investigate congestion handling mechanisms and network security.
4. Design and develop a route to reach to the correct destination by using shortest path routing and Distance Vector Routing Techniques.

DETAILED SYLLABUS:-

UNIT- I: INTRODUCTION & PHYSICAL LAYER (12 Periods)

Introduction: Uses of Computer Networks, Network Hardware: LAN, WAN, Mesh Topology, Wireless Network-system interconnection, Wireless LAN, Wireless WAN. Internetworks, Network Software-Protocol hierarchies, Design issues for the layers, Connection Oriented and Connection less Services, Service Primitives, Reference Models-OSI, TCP/IP.

The Physical Layer: Guided Transmission media-Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optics. Wireless Transmission-The Electromagnetic Spectrum, Radio Transmission & Microwave Transmission**.** Multiplexing-Frequency Division Multiplexing, Wavelength Division Multiplexing, Time Division Multiplexing.

UNIT-II: THE DATA LINK LAYER (12 Periods)

The Data Link Layer: Data Link layer design issues, Error Detection and Correction, Elementary Data Link protocols-Unrestricted simplex protocol, Simplex stop-and-wait protocol, Simplex protocol for a noisy channel. Sliding Window protocols-One-bit sliding window protocol, Protocol using Go back N**.** The Medium Access Control Sublayer-The Channel Allocation problem, Multiple access protocols-ALOHA, Pure ALOHA, Slotted ALOHA. Carrier Sense Multiple Access protocols- Persistent and Non persistent CSMA, CSMA with collision detection. Collision-Free protocols- Bit map protocol, Binary countdown, Limited Contention protocols**.**

UNIT-III: THE NETWORK LAYER (11 Periods)

Network layer design issues, Routing Algorithms-Optimality principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion Control Algorithms-Congestion Prevention Policies, Jitter Control**,** Techniques for achieving good quality of service**,** Congestion control for multicasting, Internetworking, The Network layer in the Internet**.**

UNIT-IV: THE TRANSPORT LAYER (10 Periods)

The Transport services, Elements of Transport protocols-Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash recovery, A simple Transport protocol, The Internet Transport protocols-Introduction to UDP, Remote Procedure Call, Real time transport Protocol, Introduction to TCP, The TCP Service Model, TCP protocol and TCP Segment Header.

UNIT-V: THE APPLICATION LAYER AND NETWORK SECURITY (10 Periods)

The Application Layer: Introduction to Application Layer, DNS-The Domain name space, Resource records and Name servers. Electronic Mail-Architecture and services, the user agent, message formats, message transfer and Final Delivery**.**
Network Security: Cryptography-Introduction to cryptography, Substitution Ciphers, Transposition Ciphers, One-Time Pads, and Fundamental Cryptographic Principles.

Total Periods: 55

TEXT BOOK:

1. Andrew S Tanenbaum, "*Computer Networks,*" 4th Edition, PHI publications, 2008.

REFERENCE BOOKS:

1. Forouzan, Behrouz A and Mosharraf Firouz, "*Computer Networks A Top-Down Approach,"* 1st Edition, TaTa McGraw Hill publications, 2012.
2. Stallings, William, "*Data & Computer Communications,"* 6th Edition, Pearson Education Asia, 2001.
3. Prakash C. Gupta, "*Data communications and Computer Networks"*, 1st Edition, Prentice Hall of India, 2009.

MCA – III Semester

14MC30121: OBJECT ORIENTED ANALYSIS AND DESIGN & NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
Courses on "Object Oriented Programming Through JAVA" and "Software Engineering"

COURSE OBJECTIVES:

I. To understand the principles of object orientation.
II. To understand the behavior of an Application Software before deployment by using State Chart Diagrams.
III. To analyze logical, behavioral and architectural models and apply for real world applications.
IV. To comprehend in-depth knowledge about the communication technologies like Domain Name Service, E-mail.
V. To analyze techniques to design simple network.

COURSE OUTCOMES:
After successful completion this course, the student will be able to:

1. Acquire the principles of Object Oriented Development.
2. Recognize the elements of Class, Use case, Activity, Sequence and State, diagrams and develop models using them.
3. Design the domain and application artifacts to construct the Logical, behavioral and Architectural model of an Application Software.
4. Make use of UML Tool, Rational Rose to design Class, Use Case, Sequence, Collaboration, Activity, State Chart, Component and Deployment Diagrams for the an Application Software.
5. Analysis of logical and behavioral objects of an Application Software.
6. Understand the concept of networks, different topologies, network devices and OSI reference model.
7. Analyze Error detection and correction mechanisms to verify correct data.
8. Design and develop a route to reach to the correct destination by using shortest path routing and Distance Vector Routing Techniques.

LIST OF LAB PROGRAMS:

1. **a) Identification of Classes, Objects, Attributes, Operations and Subclasses**
   From your everyday experience identify 2 original classes of objects. Choose your second one carefully, with some computerized system in mind that it could fit into.

   For each class draw a graphical representation encapsulating seven major attributes and seven operations that apply to it.

   For each of your classes state at least four examples or instantiations of it.

   b) Introduction of Inheritance

Choose a third class of object of any type suitable as a base class for a hierarchy of subclasses which will inherit all the attributes and operations of their super classes.

In a tree diagram draw this class and (some of) its subclasses, at least one of which must be three levels of hierarchy below the base class. Include significant attributes and operations.

2. **Write a program for error detecting code using CRC-CCITT (16-bits).**

3. **Write a program for frame sorting technique used in buffers.**

4. **Noun-Verb Parsing**
   Apply a noun-verb parse to the following passage to identify classes and operations. Make a table listing the classes with their operations alongside, and use it to identify any subclasses which are present.

   The Blueberry Muffin Factory buys in raw ingredients, including flour, milk, eggs and blueberries. All the ingredients except the blueberries are made into a batter. The blueberries are washed and sorted (to remove any bad berries or foreign objects) and then added to the batter. The batter is then poured into baking tins and baked. The baked muffins are cooled and packaged. The packages are put in boxes and finally distributed.

5. **Write a program for distance vector algorithm to find suitable path for transmission.**

6. **a) Understanding the Logical View of the Application: Library Management System**
   a) Identification of Objects
   b) Identification of Attributes
   c) Identification of Behaviors
   d) Identification of Relationships

   The LMS would be used by the Librarian to keep track of books, Library Members and Borrowing activities. All members cannot borrow all books; few books may be available to review in the Library itself. These books are called as Reference Books.

   There are two kinds of Library Members namely, Student Members and Faculty Members. Faculty Members can check out Research papers and Magazines, where as a Student Member can check out only Books. The system need to send an Alert, whenever a book has not returned within a specific due date to both the Librarian and the Borrower through e-mail.

   The system maintains a Catalogue of having a description of each book available in the Library.

   b) Developing a Class Diagram: Library Management System
   a) Development of Class Diagram
   b) Applying Forward Engineering and Reverse Engineering of a Class Diagram.

7. **Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.**

8. **Understanding the Interaction between Objects: Library Management System / E-Banking System**
   a) Identification of Objects
   b) Identification of Messages
   c) Development of Sequence Diagrams
   d) Development of Collaboration Diagrams

9. **Write a program for Hamming Code generation for error detection and correction.**

10. **Write a program for congestion control using Leaky bucket algorithm**
11. **Understanding the Advanced Behavioral Model of the Application: Library Management System**
    a) Identification of Actions
    b) Identification of Activities
    c) Development of Activity Diagram
    d) Development of State Chart Diagram
12. **Design TCP concurrent Client and Server application to reverse the given input sentence**

13. **Understanding the Architectural Model of the Application: Library Management System**

    a) Identification of Components
    b) Development of Component Diagram
    c) Modeling a Library Management System as Distributed System

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh and Ivar Jacobson, "*The Unified Modeling Language User Guide,*" Pearson Education, 1999.
2. www.uml.org
3. Department Lab Manual.
4. Rational Software Development Training Manual.
5. Andrew S Tanenbaum, "*Computer Networks,*" 4th Edition, PHI publications, 2008.
6. Forouzan, Behrouz A and Mosharraf Firouz, "*Computer Networks A Top-Down Approach,*" 1st Edition, TaTa McGraw Hill publications, 2012.

MCA III – Semester

14MC30122: DATA WAREHOUSING AND DATA MINING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:
A course on "Data Base Management Systems".

COURSE OBJECTIVES:

I. To understand the concepts of Data Warehouse system, Data Warehouse system architecture, data mining principles and techniques.
II. To analyze and demonstrate data mining algorithms like Apriori, FP-growth, k-mediod and gaining better understanding of business trends.
III. To develop and apply critical thinking, problem-solving, and decision-making skills.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

1. Understand the role of data warehouse, architecture and its support for quality data.
2. Ability to identify the association rules, classifying by using decision tree algorithms and clustering large data sets using k-mediods, k-means, etc.
3. Design and implement Hierarchical Methods-Agglomerative clustering, divisive hierarchical clustering and Classification by Decision Tree to perform proactive analysis, predictive modeling, and identifying new trends and behaviors.
4. Investigate preprocessing of data and apply mining techniques on it.
5. Apply data mining algorithms like J48, ID3, Random forest and evaluate results by using tool WEKA.

LIST OF LAB PROGRAMS

Using Open Source for Data Warehousing (Business Intelligence)
Integrating data from different databases to Extracting, Transformation and Loading

1. To perform various commands given in PL/SQL in Oracle 8.0(For brushing up.)
2. Knowing IDE of Open Source for Data Warehousing (Business Intelligence) for Integrating data from different databases to Extracting, Transformation and Loading

3.
   a. Construct a data acquisition process to perform the Source to target.
   b. Construct a data acquisition process to perform the Sorter Transformation and Aggregator Transformation form one data source to target.
4.
   a. Construct a data acquisition process to perform the Filter Transformation form one data source to target.
   b. Construct a data acquisition process to perform the Joiner Transformation from oracle data source to target.
   c. Construct a data acquisition process to perform the Aggregator Transformation form one data source to target.
5.

a. Construct a data acquisition process to perform the Filter Transformation and Expression Transformation in source Qualifier form one data source to target.
b. Construct a data acquisition process to perform the Joiner Transformation in source qualifier form one data source to target.

6.

a. Construct a data acquisition process to perform the Router Transformation form one data source to a minimum of three target tables.
b. Construct a data acquisition process to perform the Ranker Transformation form one data source to target.
c. Construct a data acquisition process to perform the Expression Transformation form one data source to target.

Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA) Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters. To obtain practical experience using data mining techniques on real world data sets. Emphasize hands-on experience working with all real data sets.

7.

Introduction to the Weka machine learning toolkit

a. Create a Buys_Computer dataset in .arff format. The following are the fields: age, income student,credit_rating, buys_computer
b. Create a Student Results Data set in .CSV format(Minimum required fields should be seven)

Credit Risk Assessment- Data mining case study

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance.

Translate this knowledge from text form to production rule form.

3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment.(Unless you really can consult a real loan officer !)

A few notes on the German dataset

• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

• owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
• foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

(Turn in your answers to the following tasks)

- List all the categorical (or nominal) attributes and the real-valued attributes separately.
- What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes
- One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
- Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
- Is testing on the training set as you did above a good idea ? Why or Why not One approach for solving the problem encountered in the previous question is using cross validation?
- Describe what cross-validation is briefly. Train a Decision Tree again using cross validation and report your results. Does your accuracy increase/decrease? Why?
- Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
- Another question might be, do you really need to input so many attributes to get good results?
- Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

8.

- Performing data preprocessing for data mining in Weka
- Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the mis-classifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
- Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?
- You can make your Decision Trees simpler by pruning the nodes. One approach is to use
- Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
- (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the

form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

9. Classification using the Weka toolkit
   - ✓ Classify a weather nominal dataset using J48 algorithm.
   - ✓ Classify a weather nominal dataset using ID3 algorithm.
10. Performing clustering in Weka.

11. Association rule analysis in Weka.

12. Verify ID3 classifier performance using Gain ration and Ranker method using a Knowledge flow WEKA component.

REFERENCE BOOKS:

1. Ian H. Witten, Eibe Frank, and Mark, "A Data Mining: Practical Machine Learning Tools and Techniques," 3rd Edition, Hall Morgan Kaufmann, 2011.

2. Ralph Kimball, "The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling," 3rd Edition, John Wiley & Sons Inc, 2013.

Task Resources:

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

MCA III – Semester

14MCHS02: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	--	--	--	--	3	--

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To impart practical knowledge in English Speech Sounds.
II. To develop language skills for effective communication with clarity and precision in academic, professional and personal situations.
III. To apply the practical knowledge of Functional English and vocabulary building in effective writing.
IV. To develop interest in English language so that the students use it effectively in various formal, informal and neutral situations.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Gain practical Knowledge in
   - English speech sounds
   - Accent, Rhythm and Intonation
   - Vocabulary building
2. Analyze the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts.
4. Communicate effectively with clarity and precision in various formal, Informal and neutral situations.
5. Demonstrate various language functions by participating in
   - Just a Minute
   - Role Plays
   - Presentations
   - Public speaking
6. Engage in lifelong Learning for the development of the communicative competence for meeting the global challenges.

DETAILED LIST OF EXPERIMENTS/ LAB PRACTICE SESSIONS

1. Introduction to Phonetics
2. Accent Rhythm and Intonation
3. Vocabulary Building
4. Idioms and Phrases
5. Functional English - Tenses and Voice
6. Conversation Practice / Role Plays
7. Just a Minute / Elocution
8. Public Speaking
9. Presentation Skills

10. Listening skills

Total Periods: 48 hours

REFERENCE BOOK:

1. Departmental Lab Manual

SUGGESTED SOFTWARE

1. Mastering English: Vocabulary, Grammar, Punctuation and Composition.
2. Dorling Kindersley Series of Grammar, Punctuation, Composition etc.
3. Language in use 1, 2 & 3
4. Learning to Speak English 8.1, The Learning Company – 4 CDs.
5. English in mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation Dictionary by Daniel Jones
7. Speech Solutions
8. Cambridge Advanced Learner's Dictionary - 3rd Edition
9. Centronix - Phonetics
10. Rosetta Stone
11. Let’s Talk English, Regional Institute of English South India

MCA IV-Semester

14MC40101: MANAGEMENT INFORMATION SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Database Management System" and "Organizational Behavior and Human Resource Management"

COURSE OBJECTIVES:

I. To provide basic concepts in information system and the benefits with these systems in modern society.
II. To enhance the development of Information Systems and managing information system resources.
III. To improve proficiency in solving business problems using modern productivity tools like spreadsheets and databases.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire basic knowledge on different systems like Production/Operations system, Marketing information system, Finance information system, etc.,
2. Analyze and interpret information on contemporary IS management issues.
3. Recognize transaction processing system over functional areas of information system.
4. Develop awareness of the ethical, social, and security issues of information systems.
5. Balance time/resources to deliver a range of formally and informally assessed outcomes to an individual or a team.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO MIS (11 Periods)

The meaning and role of MIS: What is MIS? Systems approach, the systems view of business, MIS organization within the company.
Management, Organizational theory and the systems approach: Development of organizational theory, Management and organizational behavior, Management, Information, and the Systems approach.

UNIT II: DECISION MAKING AND PROJECT PLANNING FOR MIS (11 Periods)

Information systems for decision making: Evolution of an information system, **Basic information systems-** Finance information system, Production / Operations System, Marketing information system, Personnel information system, other information systems.
IS Management Issues: Decision making and MIS, MIS as a technique for making programmed decisions, decision-assisting information systems.
Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning: General, detail.

UNIT III: CONCEPTUAL AND DETAILED SYSTEM DESIGN (13 Periods)

Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.
Detailed system design : Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade-off criteria, define the subsystems, sketch the detailed operating subsystems and information flows, determine the degree of automation of each operation, Inputs, outputs and processing, Early system Testing, Software, Hardware and Tools, Propose an organization to operate the system, document the detailed design, revisit the manager-user.

UNIT IV: IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS (10 Periods)

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files, test the system, cutover, document the system, evaluate the MIS, control and maintain the system.

UNIT V: PITFALLS IN MIS DEVELOPMENT (9 Periods)

Pitfalls in MIS development: Fundamental weaknesses, soft spots in planning, design problems, implementation: the TAR PIT.

Total Periods: 54

TEXT BOOK

1. R.G. Murdick, J.E. Ross and J.R. Claggett, "*Information systems for Modern Management*," 3rd Edition, Prentice-Hall of India, 2004.

REFERENCE BOOKS

1. Laudon & Laudon and V. M. Prasad, "*Management Information Systems*," 9th Edition, Pearson Education, 2005.
2. Robert Schultheis and Mary Sumner, "*Management information Systems*," 4th Edition, Prentice-Hall of India, 2004.

MCA IV – Semester

14MC40102: WEB PROGRAMMING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	--	3

PRE-REQUISITES:
A course on "Object Oriented Programming through JAVA".

COURSE OBJECTIVES:

I. To provide fundamental knowledge on Web, Architectures, Application Servers and various technologies like HTML, DHTML and XML for web application development.
II. To understand different web application programming languages like Servlets, JSP and PHP.
III. To analyze the requirements for the development of web applications.
IV. To design and develop an efficient and user friendly web application.

COURSE OUTCOMES:
After completion of this course, a successful student will be able to:

1. Acquire Knowledge in various web related concepts and technologies like client side scripting, validation of forms and AJAX programming.
2. Ability to analyze user requirements and selection of suitable web components for the development of web applications.
3. Apply prototyping technique and architectures to design dynamic, scalable, platform independent and enterprise web applications.
4. Demonstrate skills by applying security and management principles for effective implementation of web applications.

DETAILED SYLLABUS:-

UNIT-I: HTML, JAVA SCRIPT and AJAX (10 Periods)
Introduction to HTML, structure of HTML, Lists, Tables, images, forms, Frames, Cascading Style sheets, Introduction to Java Scripts, Objects in Java Script, and Dynamic HTML with Java Script, Introduction to AJAX.

UNIT-II: XML TECHNOLOGY (12 Periods)
Introduction to XML, XML Basics, DTD, Advanced XML: XML Namespaces, XML CDATA, XML Encoding, XML on the Server, XML Application, XMLHttpRequest Object, XML Technologies: XHTML, Java API for XML Processing, DOM, SAX, XSLT, Xpath.

UNIT-III: SERVLETS (10 Periods)
Introduction to Servlets, features of Java Servlets, exploring the servlet API, servlet life cycle, working with ServletConfig and ServletContext Objects, Creating a simple servlet, the HttpServletRequest and HttpServletResponse Interfaces, Session Tracking, JDBC, and Multitier Applications:Using JDBC from a Servlet.

UNIT-IV: JSP (10 Periods)

Introduction to JSP, Describing the JSP Life Cycle, Creating Simple JSP Pages, Working with JSP Basic Tags and Implicit Objects, Using JavaBeans and Action Tags in JSP, Using the JSP Standard Tag Library [JSTL], Describing JSTL Core Tags, Describing the JSTL SQL Tags.

UNIT-V: PHP **(13 Periods)**

Introduction to PHP, Working with Variables and Constants, Controlling Program Flow, Working with Functions and Arrays, Working with Files and Directories, Working with Forms and Database, Exploring Cookies and Sessions.

Total Periods: 55

TEXT BOOK:

1: Kogent Learning Solutions Inc., "*Web Technologies Black Book",* Dreamtech Press, 2011.

REFERENCE BOOKS:

1: H. M. Deitel, P.J. Deitel, and T. R. Nieto, "*Internet and World Wide Web – How to program",* Pearson Education, 2006.
2: Steven Holzner, "*The Complete Reference PHP*", 1st Edition, Tata McGraw-Hill Education Pvt. Ltd., 2007.
3: Uttam K Roy "*Web Technologies*", 1/e, Oxford University Press, 2010.

MCA IV-SEMESTER

14MC40103: BIG DATA ANALYTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
Course on "Data warehousing and Data Mining," and "Object Oriented Programming"

COURSE OBJECTIVES:

I. To impart Knowledge on fundamentals, Large Data sets, dimensions of Big Data.
II. To provide knowledge on current Big Data trends, Data Analytics and Big Data Security.
III. To acquire skills on Big Data Tools such as SQOOP, PIG, Hive and Mahout.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire knowledge of HDFS and MapReduce in Big Data Hadoop.
2. Solve problems in modern Data Analysis and Big Data Analytics.
3. Design, develop and analyze applications for Volume, Velocity and variety of Hadoop Framework based applications.
4. Design & Develop a large size system following the dimensions, practices, and methods for analyzing Big Data applications.
5. Effectively utilize the modern tools like HADDOP, HIVE, PIG etc.,
6. Follow ethical code of conduct in professional activities such as Data reports, evaluation and Data analytics.

DETAILED SYLLABUS:-

UNIT- I: INTRODUCTION TO BIG DATA (11 Periods)

Introduction to Big data: The Evolution of Big Data, What Is Big Data, Why Big Data Matters, Big Data Sources, The Big data Revolution, Security, Compliance, Auditing and Protection.
Big Data in the Enterprise: New Business Models, New Revenue Growth Opportunities, What Technology Investments Can Enable the Analytics Capabilities? How Do You Get Started on the Big Data Journey?

UNIT-II: APPLICATION ARCHITECTURES FOR BIG DATA AND ANALYTICS (10 Periods)

Big Data Warehouse and Analytics, Big Data Warehouse System Requirements and Hybrid Architectures, Enterprise Data Platform Ecosystem – BDW and EDW, How does Traditional Data Warehouse processes map to tools in Hadoop Environment?
Big Data Analytics Methodology: Challenges in Big Data Analysis, Big Data Analytics Methodology, Develop Business Hypotheses

UNIT-III: HADOOP (11 Periods)

Meet Hadoop: Data Storage and Analysis, Comparison with Other Systems, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.

MapReduce: A Weather Dataset, Analyzing the Data with Unix Tools, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes.
The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop File systems.

UNIT – IV: APPLICATIONS OF HADOOP MAPREDUCE (11 Periods)

Hadoop I/O: Data Integrity, Compression, Serialization, File-Based Data Structures.
Developing a MapReduce Application: The Configuration API, Configuring the Development Environment, Writing a Unit Test, Running Locally on Test Data, Running on a Cluster.
How MapReduce Works: Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution.
MapReduce Types and Formats: MapReduce Types, Input Formats, Output Formats.

UNIT -V: FEATURES AND ADMINISRATION OF HADOOP (12 Periods)

MapReduce Features: Counters, Sorting, Joins, Side Data Distribution, MapReduce Library Classes.
Setting Up a Hadoop Cluster: Cluster Specification, Cluster Setup and Installation, SSH Configuration, Hadoop Configuration, YARN Configuration, Security, Benchmarking a Hadoop Cluster, Hadoop in the Cloud.
Administering Hadoop: HDFS, Monitoring, Maintenance.
Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions

Total Periods: 55

TEXT BOOKS:

1. Tom White, "*Hadoop: The Definitive Guide*," Oreilly and Yahoo press, Third Edition, 2012.
2. Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivasta "Big Data Imperatives", Apress, First Edition, 2013.

REFERENCE BOOK:

1. Frank J. Ohlhorst**, "***Big Data Analytics: Turning Big Data into Big Money*," Wiley Publication, ISBN: 1118147596, December 2012.

MCA IV-Semester

14MC40105: SOFTWARE PROJECT MANAGEMENT

(ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Software Engineering"

COURSE OBJECTIVES:

I. To present basic knowledge in conventional and modern software project management principles.
II. To identify the steps of project planning, management, quality assurance and their relationships.
III. To develop their skills for tracking, controlling software deliverables with in schedule and budget.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Implement a project to manage project schedule, expenses and resources of a application.
2. Identify the resources required for a project and to produce a work plan and resource schedule.
3. Design and develop project plans to address real-world management challenges.
4. Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.
5. Understand modern software project management principles as a member and leader in a team to manage the projects.

DETAILED SYLLABUS

UNIT- I: INTRODUCTION TO CONVENTIONAL SOFTWARE MANAGEMENT & IMPROVING SOFTWARE ECONOMICS (10 Periods)

Conventional Software Management: The waterfall model, conventional software management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation through software environments, Achieving required quality, peer inspections: A Pragmatic view.

UNIT- II: PRINCIPLES, LIFE CYCLE PHASES AND ARTIFACTS OF THE PROCESS (12 Periods)

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process
Life cycle phases: Engineering and production stages, inception phase, Elaboration phase, construction phase, transition phase.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts.

UNIT –III: SOFTWARE ARCHITECTURE, WORKFLOWS & CHECKPOINTS OF THE PROCESS (12 Periods)

Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process workflows, Iteration workflows.
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work breakdown structures, Planning guidelines, Cost and schedule estimating process, Iteration planning process, Pragmatic planning.

UNIT- IV: PROJECT ORGANIZATIONS & RESPONSIBILITIES, PROCESS AUTOMATION (9 Periods)

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, Evolution of Organizations.
Process Automation: Tools: Automation Building blocks, The Project Environment: Roundtrip Engineering, Change management, Infrastructures, Stakeholder Environments.

UNIT -V: PROJECT CONTROL & PROCESS INSTRUMENTATION, TAILORING THE PROCESS AND FUTURE SPM (10 Periods)
Project Control and Process instrumentation: The seven core Metrics, Management indicators, Quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminants.
Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

Total Periods: 53

TEXT BOOK:

1. Walker Royce, "*Software Project Management*," 6th Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. Bob Hughes and Mike Cotterell, "*Software Project Management*," 4th Edition, Tata McGraw-Hill, 2006.
2. Joel Henry, "*Software Project Management"*, Pearson Education, 2004.
3. Pankaj Jalote, "*Software Project Management in practice*," Pearson Education, 2002.

MCA IV-SEMESTER

14MC40111: INFORMATION RETRIEVAL SYSTEMS

(ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
A course on "Data Warehousing and Data Mining"

COURSE OBJECTIVES:

I. To understand Information Retrieval System and various text retrieval (search, browse and Miscellaneous) capabilities.
II. To excel in finding relevant information and subsequently extract meaningful patterns.
III. To apply algorithms of textual document indexing, relevance ranking, text analytics, as well as their performance evaluations.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

1. Aware of theoretical and practical aspects of information retrieval Systems.
2. Identify the various research algorithms.
3. Design and develop the probabilistic retrieval methods, algorithms and ranking principles.
4. Effectively make use of many search engines using searching techniques.

DETAILED SYLLABUS:-

UNIT – I: INTRODUCTION AND INFORMATION RETRIEVAL SYSTEM CAPABILITIES (12 Periods)

Introduction to IRS: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.
Information Retrieval System Capabilities: **Search Capabilities**- Boolean logic, Proximity, contiguous word phrases, fuzzy searches, Term masking, **Browse Capabilities**-Ranking, Zoning, Highlighting, **Miscellaneous Capabilities**- vocabulary Browse, canned query.

UNIT – II: CATALOGING AND INDEXING AND DATA STRUCTURE (10 Periods)

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.
Data Structure: Introduction to data structure, Stemming Algorithms: Introduction to stemming process, Porter stemming algorithm, Successor stemmers, Inverted file Structure, N-Gram Data Structures PAT Data Structure.

UNIT -III: AUTOMATIC INDEXING (10 Periods)

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing-probabilistic weighting, Vector weighting, Natural Language, Concept Indexing, Hypertext Linkages.
Document and Term Clustering: Introduction to clustering, Thesaurus Generation, Automatic term clustering- complete term relation method, clustering using existing clusters, one pass assignments**.**

UNIT – IV: USER SEARCH TECHNIQUES AND INFORMATION VISUALIZATION (11 Periods)

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext.

Information Visualization: Introduction, Cognition and Perception, Information Visualization Technologies.

UNIT – V: TEXT SEARCH ALGORITHMS AND INFORMATION SYSTEM EVALUATION (12 Periods)

Text Search Algorithms: Introduction to text search techniques, Software Text Search Algorithms, Hardware Text Search Systems

Information System Evaluation: Introduction to information system evaluation, Measures Used in System Evaluations, Measurement Example – TREC Results.

Total periods: 55

TEXT BOOK:

1. Gerald J. Kowalski and Mark T. Maybury, "*Information Storage and Retrieval Systems,"* 2nd Edition, Springer International Edition, 2009.

REFERENCE BOOKS:

1. Ricardo Baeza – Yates, Berthier Ribeiro-Neto, "*Modern Information Retrieval,"* Pearson Education, 2004.
2. Robert R. Korfhage, "*Information Storage and Retrieval*," John Wiley and Sons, 1997.

MCA IV-SEMESTER

14MC4HS01: BUSINESS COMMUNICATION AND PRESENTATION SKILLS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:--

COURSE OBJECTIVES:

I. To impart knowledge of business communication and presentation skills.
II. To hone communication, career and presentation skills for professional practice and management.
III. To apply the acquired skills in real time professional environment.
IV. To enhance self confidence and instill apt attitude and flair for life- long learning.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

1. Broaden their knowledge of business communication, career and presentation skills.
2. Identify requirements of various business scenarios and analyze appropriate professional mode of interaction to be adopted.
3. Apply the acquired skills in real time scenarios of professional context.
4. Function effectively as a member or a leader in teams and multidisciplinary settings with expertise in public speaking and presentation skills.
5. Communicate effectively in interviews, group discussions and business communication.
6. Passionately involve in independent and life-long learning of evolving professional communication.

DETAILED SYLLABUS

UNIT – I: NATURE AND SCOPE OF COMMUNICATION
Introduction - Functions of Communication - Roles of a Manager - Communication Basics - Communication Networks - Informal Communication - Tips for Effective Internal Communications - Interpersonal Communication - Communication Barriers - Effective Managerial Communication - Strategies for Improving Organizational Communication.

UNIT – II : NON-VERBAL COMMUNICATION
Introduction - Significance of Non-verbal Communication in Organizations - Forms of Non-verbal Communication - Types of Non-verbal Communication - Cross Cultural Communication: Introduction - Concept of Cross cultural Communication - Different Communication Styles - Cross-cultural Communication Strategies - Corporate Communication: Introduction - Crisis Management / Communication - Case Study.

UNIT – III : WRITING BUSINESS DOCUMENTS

Business Writing: Introduction - Importance of Written Business Communication - Five Main Stages of Writing Business Messages; Business Letter Writing: Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters; Business Reports - Kinds of Reports - Characteristics of Business Reports - Steps in Writing a Routine Business Report - Corporate Reports.

UNIT – IV : BUSINESS PRESENTATIONS AND PUBLIC SPEAKING

Introduction - Business Presentations Speeches - Introduction to a presentation - Main Body - Conclusion - Effective Sales Presentations - Case Study; Group Discussions: Introduction - Work Place GD Guidelines - Functional and Non-functional Roles in Group Discussions; Team Presentations: Benefits of Team Presentations - Purpose of Team Presentations - Case Studies.

UNIT – V : CAREERS AND RESUME

Introduction - Career Building: Understanding Yourself - Setting a Career Goal - Résumé Writing: Résumé Formats; Interviews: Introduction - Fundamental Principles of Interviewing - General Preparation for an Interview - Success in an Interview - Types of Interviewing Questions - Important Non-verbal Aspects - Types of Interviews - Styles of Interviewing - Case Interviews.

TEXT BOOK

1. Business Communication, Meenakshi Raman and Prakash Singh, Oxford University Press, New Delhi, Second Edition, 2012.

REFERENCES

1. *Business Communication*, M K Sehgal and Vandana Khetarpal, Excel Books, New Delhi, 2011.
2. *Effective Technical Communication*, M Ashraf Rizvi, Tata McGraw–Hill, 2009.
3. *Business Communication*, P D Chaturvedi and Mukesh Chaturvedi, Pearson Education Pvt. Ltd, New Delhi, 2006.
4. *Business Communication*, R K Madhukar, Vikas Publishing House Pvt Ltd., 2005.

MCA IV – Semester

14MC40121: WEB PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	--	--	3	2

PRE-REQUISITES:

A course on "Object Oriented Programming through JAVA"

COURSE OBJECTIVES:

I. To provide fundamental knowledge on Web, Architectures, Application Servers and various technologies like HTML, DHTML and XML for web application development.
II. To understand different web application programming languages like Servlets, JSP and PHP.
III. To analyze the requirements for the development of web applications.
IV. To design and develop an efficient and user friendly web application.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire Knowledge in various web related concepts and technologies like client side scripting, validation of forms and AJAX programming.
2. Ability to analyze user requirements and selection of suitable web components for the development of web applications.
3. Apply prototyping technique and architectures to design dynamic, scalable, platform independent and enterprise web applications.
4. Demonstrate skills by applying security and management principles for effective implementation of web applications.
5. Adapt tools like Apache Tomcat Server and XAMPP Control Panel for implementing Web Applications.

LIST OF LAB PROGRAMS:

1. Develop static pages of an online Book Store by only using HTML (the pages should resemble: www.amazon.com). The website should consist the following pages.
    a. Home Page
    b. Registration and User Login
    c. Books Catalog
2.
    a. Design and develop a Feedback form using JavaScript.
    b. Validate the Registration and User Login pages of program – 1.
3. Create a web page with all types of Cascading style sheets.
4. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

5. Programs using XML Schema, XSLT/XSL

6. Program using DOM / SAX.

7. a. Write a java program to get IP Address, Host Name and Port Numbers of a Local System
   b. Write a Java Program using Datagram Communication.
8. Write a basic Servlet program that must display information like

   a. Request method used by the client and
   b. Current system date
9. Generate JSP pages to

   a. Current system date
   b. Page should include two files (either html or jsp files) by using include directive.
   c. Page should include two files (either html or jsp files) by using include action.
   d. Any mathematical table by using Scriptlet Elements (Declaration, Expression and Scriptlet tags).
   e. Page must perform forward action.
10. Write a JSP program for finding total number of visitors in a site to keep track of active users at a given instance of time, and also display the user session starting time.

11. Write a JSP program that creates a cookie on username which is send from html file and display the cookie value as a response. The cookie must be active based on the maximum active interval time.

12. Develop java program for following SQL operations using JDBC.

    a. Create
    b. Insert
    c. Update and
    d. Delete

Consider the following schema:
Employee (EmpName, EmpNo Primary Key, Department, Salary)
13. Generate a JSP page that will retrieve the Employee information from the database. The page should display the employee records in a tabular format.

14. a. Write a PHP program to demonstrate GET and POST method of passing the data between pages.
    b. Write a PHP program to demonstrate Array, Key-pair values.
    c. Write a PHP program to read and write the Data from the Database.
15.
    a. Implementing the OOPs concept in PHP.
    b. Create a PHP page that uses Session and cookies.
    c. File Handling in PHP.

REFERENCE BOOKS:
1. Kogent Learning Solutions Inc., "*Web Technologies Black Book",* Dreamtech Press, 2011.

MCA IV-SEMESTER

14MC40122: MINI PROJECT

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	-	2

PRE-REQUISITES: --

COURSE OBJECTIVES:

I. To gain access to advanced knowledge on a chosen topic in the programme domain and inter-disciplinary areas through literature survey.
II. To develop analytical, problem solving, programming, design and development skills for effective project implementation.
III. To apply knowledge and skills to develop research competence in core and inter-disciplinary.
IV. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire Knowledge in the areas of interest.
2. Analyze critically chosen project topic for conducting research.
3. Apply knowledge gained through programme, self-learning and experience for solution of a given problem efficiently.
4. Undertake research confidentially in the project domain.
5. Use the techniques, skills and modern engineering tools necessary for mini project.
6. Perform harmonically in multi-disciplinary and multi-cultural groups and develop a high level of inter-personal skills.
7. Manage projects in respective disciplines and multi-disciplinary environments with due consideration to cost and time efficiency.
8. Develop communication skills, both oral and written for preparing and presenting reports.
9. Engage in life-long learning to improve knowledge and competence continuously.
10. Understanding professional and ethical responsibility for sustainable development of society.
11. Develop independent and reflective learning.

MCA V-Semester

14MC50101: INFORMATION SECURITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A course on "Computer Networks"

COURSE OBJECTIVES:

I. To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT Industry.

II. To understand the importance of physical security for a network, to describe various encryption techniques and have a knowledge on designing a secured computer network.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Understand the principles and practices of Cryptography and Network Security.
2. Realize the role played by Cryptographic techniques in enhancing Network and System Security.
3. Identify and explain the concepts, protocols and technologies associated with a secure communication across the Network and the Internet.
4. Confer the objectives of authentication and access control methods and describe how the available methods are implemented in the defense of a network.

DETAILED SYLLABUS:-

UNIT-I: INTRODUCTION TO SECURITY, CLASSIC ENCRYPTION TECHNIQUES (9 Periods)

Introduction: Introduction to Security - Security Trends, The OSI Security Architecture, Security Attacks, Security Services and Mechanisms. A model for Network security, Internet Standards and the Internet Society.
Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques – Caser Cipher, Monoalphabetic Ciphers, Play fair Cipher, Hill Cipher, Polyalphabetic Ciphers and One – Time pad. Transposition Techniques, Introduction to Steganography.
Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Multiple Encryption and Triple DES.

UNIT-II: CONFIDENTIALITY USING CONVENTIONAL ENCRYPTION TECHNIQUES (10 Periods)

Advanced Encryption Standard: AES Cipher, Block Cipher Modes of Operation, Stream Ciphers and RC4, Placement of Encryption Function, Traffic Confidentiality, Key Distribution.
Public-Key Cryptography: Principles of Public-Key Cryptosystems, Public-Key Cryptography algorithms - The RSA Public-Key Encryption Algorithm, Diffie – Hellman Key Exchange, Key Management.

UNIT-III: MESSAGE AUTHENTICATION AND HASH FUNCTIONS (11 Periods)

Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes.
Hash Functions: Hash Functions, Secure Hash Algorithm – SHA-512 Logic and Round Function, HMAC, Digital Signatures, Digital Signature Standard.
Authentication Applications: Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY AND IP SECURITY (13 Periods)

Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.
IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT-V: WEB SECURITY AND SYSTEM SECURITY (13 Periods)

Web Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.
System Security: Intruders, Intrusion Detection systems, Viruses and Related Threats, Virus Countermeasures, Firewall Design Principles, Trusted Systems.

Total No. of Periods: 56

TEXT BOOK:

1. William Stallings, "*Cryptography and Network Security*", Pearson Education, 4th Edition, 2009.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "*Cryptography and Network Security*", Tata McGraw-Hill, 2007.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "*Network Security - Private Communication in a Public World*", Pearson Education, 2nd Edition, 2005.
3. Michael E. Whitman, Herbert J. Mattord, "*Principles of Information Security*", Cengage Learning, 2008.
4. William Stallings, "*Network Security Essentials (Applications and Standards)*", Pearson Education, 3rd Edition, 2009.

MCA V-SEMESTER

14MC50102: SOFTWARE TESTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
A course on "Software Engineering"

COURSE OBJECTIVES:

I. To introduce the students about the importance of testing, methods and various test types.
II. To enrich the need for automated software testing tools.
III. To test the various applications requirements like functional, non-functional using automated test tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Analyze the problem definitions by using the system requirement specifications.
2. Design and develop various test condition and test cases for unit, integration, system test level.
3. Apply various research methodologies on testing approaches, bug reporting.
4. Apply different automated testing tools like QTP, LoadRunner, Rational Functional Tester.
5. Create detailed test cases and an effective test plan.
6. Test code as well as artifacts in a better way.

DETAILED SYLLABUS

UNIT – I: TESTING METHODOLOGY (9 Periods)

Introduction to software Testing: Introduction, Evolution of software Testing, Software Testing-Myths and Facts, Goals of software Testing, Software testing definitions Effective software Testing Vs Exhaustive Software Testing, Software Testing as a process
Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life cycle (STLC), Software Testing Methodology.

UNIT – II: TESTING TECHNIQUES (10 Periods)

Dynamic Testing: Black-box Testing Techniques: Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-based testing, Decision table-based testing, cause-effect Graphing Based testing.
White-box Testing Techniques: Need of white-box testing, Logic coverage criteria, basis path testing**,** Loop testing, Data flow testing, Mutation Testing.

UNIT – III: STATIC TESTING, SOFTWARE METRICS & NEED FOR AUTOMATION (9 Periods)

Static Testing: Inspections, Walkthroughs, Technical reviews.
Software Metrics: Definition of software metrics, Classification of software metrics, Entities to be measured, Size metrics.

Need for Automation: Introduction, Categorization of Testing tools, selection of testing tools, costs incurred in testing tools, Guidelines for automated testing.

UNIT -IV: TESTING FOR SPECIALIZED ENVIRONMENTS AND FUNCTIONAL TEST TOOL (14 Periods)

Testing for specialized Environment: Object-oriented Testing software and web-based software, challenges in testing for web-based software, Testing of web-based systems.
Functional Test Tool: Overview of Functional test tool (QTP/RFT/Selenium), Test Recording, Test Running, Synchronization of test cases, creating checkpoints, testing with parameterization.

UNIT – V: REGRESSION TESTING AND PERFORMANCE TEST TOOL (12 Periods)

Regression Testing: Progressive vs. regressive Testing, Objectives of Regression Testing, When is Regression testing Done? Regression testing types, Defining regression Test problem, Regression testing techniques
Performance Test Tool: Overview of performance test tool (LoadRunner/ OpenSTA/ Load UI), Creating Vuser script using virtual user Generator, Creating virtual users using Load Controller**.**

Total periods: **54**

TEXT BOOKS:

1. Naresh Chauhan, "*Software testing principles and practices*," Oxford higher education,2010.
2. Dr. K.V.K.K Prasad, "*Software Testing tools*," Dreamtech Press, Reprint Edition, 2007.

REFERENCE BOOK:

1. Boris Beizer, "*Software Testing techniques,"* Dreamtech Press, second edition, 2006.

MCA V-Semester

14MC50103: CLOUD COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

Courses on "Computer Networks" and "Database Management System".

COURSE OBJECTIVES:

I. To provide knowledge on importance of Cloud computing, Cloud Security, Disaster Recovery and Cloud vendors.
II. To acquire skills on Virtualization Technologies such as VMware, Hyper-V.
III. To apply knowledge & skills of Cloud Computing programming in developing service oriented applications.
IV. To create attitude for maintaining security in different Cloud based applications.

COURSE OUTCOMES:

1. Acquire knowledge on services and types of infrastructural models in Cloud.
2. Gain problem solving to assess & improve quality attributes security, privacy concerns, and performance in Cloud Computing.
3. Apply the Cloud Architectures while developing the Web Applications. Design & Deploy common standard principles, practices, and methods for building Cloud based applications.
4. Inculcate ethical code of conduct in performing professional activities such as Storage, Services and Deploying of Cloud Computing applications.

DETAILED SYALLABUS

UNIT-I: INTRODUCTION TO VIRTUALIZATION (10 Periods)

Virtualization: Introduction to Virtualization, objectives of virtualization, benefits of virtualized technology, Adding guest Operating system.
Virtualization Technologies: Ubuntu, VMware, Microsoft Hyper-V.

UNIT-II: DEFINING CLOUD COMPUTING (11 Periods)

Defining Cloud Computing: Defining Cloud Computing, Cloud Types - The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the Role of Open Standards.
Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new applications, The laws of cloudonomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the Total Cost of Ownership, Specifying Service Level Agreements, Defining Licensing Models.
Understanding Cloud Architecture: Exploring the Cloud Computing Stack, Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud, The Jolicloud Netbook OS, Chromium OS: The Browser as an Operating System.

UNIT-III: UNDERSTANDING SERVICES AND APPLICATIONS BY TYPE (11 Periods)

Understanding Services And Applications By Type : Defining Infrastructure as a Service (IaaS), IaaS workloads, Pods, aggregation, and silos, Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), SaaS characteristics, Open SaaS and SOA, Salesforce. com and CRM SaaS, Defining Identity as a Service (IDaaS), What is an identity? Networked identity service classes, Identity system codes of conduct, IDaaS interoperability Defining Compliance as a Service (CaaS).

Understanding Abstraction and Virtualization: Using Virtualization Technologies, Load Balancing and Virtualization, Advanced load balancing, The Google cloud Understanding Hypervisors, Virtual machine types, VMware vSphere, Understanding Machine Imaging, Porting Applications, The Simple Cloud API, AppZero Virtual Application Appliance.

Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Baseline measurements, System metrics, Load testing, Resource ceilings, Server and instance types, Network Capacity, Scaling.

UNIT-IV: EXPLORING PLATFORM AS A SERVICE (11 Periods)

Exploring Platform as a Service: Defining Services, Salesforce. com versus Force. com: SaaS versus PaaS, Application development, Using PaaS Application Frameworks, Drupal, Eccentex AppBase 3.0, LongJump, Squarespace, WaveMaker, Wolf Frameworks.

Using Google Web Services: Exploring Google Applications, Surveying the Google Application Portfolio, Indexed search, The dark Web, Aggregation and disintermediation, Productivity applications and services, Enterprise offerings, AdWords, Google Analytics, Google Translate, Exploring the Google Toolkit, The Google APIs, Working with the Google App Engine.

Using Amazon Web Services: Understanding Amazon Web Services, Amazon Web Service Components and Services, Working with the Elastic Compute Cloud (EC2), Amazon Machine Images, Pricing models, System images and software, Creating an account and instance on EC2, Working with Amazon Storage Systems, Amazon Simple Storage System (S3), Amazon Elastic Block Store (EBS), CloudFront, Understanding Amazon Database Services, Amazon SimpleDB, Amazon Relational Database Service (RDS), Choosing a database for AWS.

UNIT-V: USING MICROSOFT CLOUD SERVICES (11 Periods)

Using Microsoft Cloud Services: Exploring Microsoft Cloud Services, Defining the Windows Azure Platform, The software plus services approach, The Azure Platform, The Windows Azure service, Windows Azure AppFabric, Azure Content Delivery Network, SQL Azure, Windows Azure pricing, Windows Live services, Using Windows Live, Windows Live Essentials, Windows Live Home, windows live for mobile.

Managing the Cloud: Administrating the Clouds, Management responsibilities, Lifecycle management, Cloud Management Products, Emerging Cloud Management Standards, DMTF cloud management standards, Cloud Commons and SMI.

Understanding Cloud Security: Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards, Windows Azure identity standards, Presence.

Total Periods: 54

TEXT BOOKS:

1. Barrie Sosinsky, *"Cloud Computing Bible,"* Wiley India Pvt Ltd, 1st Edition, 2011.
2. Ivanka Menken Ivanka Menken, *"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book",* Emereo Publishing, 2nd Edition, 2012.

REFERENCE BOOKS:

1. Anthony T. Velte, Toby J. Velte Robert Elsenpeter, *"Cloud Computing: A practical Approach"*, Tata Mc Graw Hill, ISBN: 9780071626941,2010.
2. John W. Rittinghouse, James F. Ransome, *"Cloud Computing implementation, Management and Security"*, CRC Press, ISBN: 9788120341609, Taylor & Francis group, 2010.
3. George Reese, *"Cloud Application Architectures",* Oreilly publishers, 1st Edition, 2010.
4. David S. Linthicum, *"Cloud Computing and SOA Convergence in your Enterprise",* Addison- Wesley, 2010.

MCA V-Semester

14MC50106: MIDDLEWARE TECHNOLOGIES

(ELECTIVE – III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:

A Course on "Object Oriented Programming"

COURSE OBJECTIVES:

I. To understand the principles of C#, Microsoft Visual C# and Visual Studio to build .NET Framework applications.
II. To excel with advanced C# programming concepts like delegates and events.
III. To develop ADO.NET and ASP.NET applications using Visual Studio.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Understand the usage of .NET Framework and Visual Studio.
2. Analyze to solve problems using C# Programming Language.
3. Develop and execute various windows and web applications using Visual Studio.
4. Analyze and interpret data while designing applications.
5. Adapt and design applications using .NET Framework 4.0.

DETAILED SYLLABUS:-

UNIT-I: INTRODUCING C# AND .NET PLATFORM (11 Periods)

Benefits of the .NET platform, Building blocks of the .NET platform, Overview of .NET assemblies, Common type system, Common language specification, Common language runtime, Platform-independent nature of .NET, Introduction to Visual Studio.

The role of the .NET framework 4.5 SDK, Building .NET application using visual studio, Anatomy of a simple c# program, System. Console class, System data types and corresponding c# keywords. Working with string data, C# iteration constructs Decision constructs and the Relational/equality operators.

UNIT-II: CORE C# PROGRAMMING & OOP WITH C# AND EXCEPTION HANDLING (10 *Periods*)

Understanding **C#** arrays**,** Introducing the C# class type, Constructors, The role of the this keyword, The static keyword, Pillars of OOP, C# access modifiers, C# encapsulation services, Understanding automatic properties , The basic mechanics of inheritance , C#'s polymorphic support.

The role of .NET Exception Handling, The simplest possible example, System-level exceptions, Application level exceptions, Processing multiple exceptions.

UNIT-III: INTERFACES, GENERICS, DELEGATES AND EVENTS (12 Periods)

Understanding interface types, Defining custom interfaces, Implementing an interface, Implementing an interfaces using visual studio, Role of generic type parameters , Creating custom generic methods, Creating custom generic structures and classes, Understanding the .NET delegate type, Delegate example, Generic delegate, and C #events , Understanding operator overloading.

UNIT-IV: ADO.NET **(12 Periods)**

High level definition of ADO.NET, ADO.NET data provider, ADO.NET namespaces, Connected layer of ADO.NET, Data Readers , Database transactions, Disconnected layer of ADO.NET, Role of the dataset, Working with DataColumns, Data Rows, DataTable , Binding DataTable objects to windows forms GUIs, DataAdapters.

UNIT-V: ASP.NET Web Forms and Web Controls, State Management Techniques **(10 Periods)**

Introduction to ASP.NET, ASP.NET web forms, Role of http, Web applications and web servers, Role of client side scripting, Posting back to the web server, Overview of ASP.NET API, Building a single file ASP.NET web page, building an ASP.NET webpage using Code Files, ASP.NET web sites vs. ASP.NET Web applications, ASP.NET web site directory structure, The life cycle of an ASP.NET web page, Role of the web.config file, Understanding the nature of web controls, Major categories of ASP.NET web control , The Role of validation controls, Maintaining session data , Cookies.

Total Periods: *55*

TEXT BOOK:

1. Andrew Troelsen, *"Pro C# 5.0 and the .NET 4.5 Framework,"* 6th Edition, Apress, 2013.

REFERENCE BOOKS:

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner, *"Professional C# 4 and .NET 4,"* Wrox Publications, 2010, ISBN: 978-0-470-50225-9.
2. Mathew Mac Donald "*The Complete Reference ASP.NET," TATA McGraw Hill, 2010*

MCA V-SEMESTER

14MC50108: BUSINESS INTELLIGENCE

(ELECTIVE -IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	3

PRE-REQUISITES:
A course on "Data Warehousing and Data Mining"

COURSE OBJECTIVES:

I. Understand the foundations and key issues of managerial decision making.
II. Learn the major frameworks of computerized decision support (DSS) and Business Intelligence (BI).
III. Gain familiarity with the process, methods and applications of text and web mining.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:

1. Apply the various domains knowledge like banking, finance and insurance.
2. Understand concepts and methods designed to improve the business decision making process.
3. Design & Develop a large size system following the dimensions, practices, and methods for analyzing Data reports.
4. Apply a BI meta model to data, Analyzing a BI maturity model to identify critical attributes and mapping operational data to data warehouse.

DETAILED SYLLABUS:-

UNIT – I: DECISION SUPPORT AND BUSINESS INTELLIGENCE (12 Periods)
Decision support systems and Business Intelligence: Introduction, Changing business environments and computerized decision support, Managerial Decision making, Computerized support for decision making, An early framework for computerized decision support, the concept of decision support systems, A framework for business intelligence
Computerized Decision Support: Introduction and definitions, Models, Phases of decision-making process, Decision-making Phases

UNIT – II: DECISION SUPPORT SYSTEMS CONCEPTS, METHODOLOGIES, AND TECHNOLOGIES (10 Periods)

Decision support system configurations, Decision support system description, Decision support system characteristics and capabilities, Decision support system classifications, components of Decision support system
Modeling and Analysis: Management support systems modeling, Structure of mathematical models for decision support, Certainty, uncertainty and risk.

UNIT -III: DATA MINING FOR BUSINESS INTELLIGENCE (10 Periods)
Data mining concepts and applications, Data mining applications, Data mining process, data mining methods, Data mining software tools

Text and web mining: Text mining concepts and definitions, Natural language processing, Text mining applications, text mining process, Text mining tools, web mining overview

UNIT – IV: BUSINESS PERFORMANCE MANAGEMENT AND KNOWLEDGE MANAGEMENT (10 Periods)

Business performance management: Business Performance Management (BPM) overview**,** Performance measurement, BPM methodologies, BPM Technologies and Applications, Performance dashboards and scorecards
Knowledge Management: Introduction to Knowledge Management, Organizational learning and transformation, Knowledge management activities, Approaches to knowledge Management, Information technology in knowledge management

UNIT – V: INTELLIGENT SYSTEMS (12 Periods)

Concepts and definitions of artificial intelligence,(532-533) T1 Basic concepts of expert systems, Applications of Expert systems, Structure of Expert systems, Knowledge Engineering**,** Machine Learning techniques, case-based reasoning, Genetic algorithms and Developing GA applications, Fuzzy logic and Fuzzy inference systems, Support vector machines

Total periods: **54**

TEXT BOOK:

1. Efraim Turban, E.Aronson, Teng-Peng Liang, and Ramesh Sharda, "*Decision Support and Business Intelligence Systems*," 9th Edition, Pearson Education, 2009.

REFERENCE BOOK:

1. David Loshin*, Business Intelligence,* Morgan Kaufmann Publishers, 2003.

MCA V-SEMESTER

14MC50121: INFORMATION SECURITY LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

A course on "Computer Networks"

COURSE OBJECTIVES:

I. To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT Industry.

II. To understand the importance of physical security for a network, to describe various encryption techniques and have a knowledge on designing a secured computer network.

COURSE OUTCOMES:

On completion of this course, a successful student will be able to:

1. Understand the principles and practices of Cryptography and Network Security.
2. Realize the role played by Cryptographic techniques in enhancing Network and System Security.
3. Identify and explain the concepts, protocols and technologies associated with a secure communication across the Network and the Internet.
4. Confer the objectives of authentication and access control methods and describe how the available methods are implemented in the defense of a network.

LIST OF LAB PROGRAMS:

1. Write a program for the implementation of encryption and decryption using one time pad.
2. Write a program for the implementation of encryption and decryption using mono alphabetic cipher.
3. Write a program for the implementation of encryption using Substitution and transposition techniques for the following message: "PLEASETRANSFERONEMILLIONDOLLARSTOMYSWISSBANKACCOUNTSIXTWOTWO"
4. Write a program for the implementation of Playfair and Caser ciphers.
5. Write a program for the implementation of Vigenere cipher (Polyalphabetic substitution).
6. Write a program for the implementation of Hill cipher and Gauss cipher.
7. Write a program for the implementation of Rail Fence cipher.
8. Write a program for the implementation of S-DES algorithm for data encryption and decryption.
9. Write a program for the implementation of encryption and decryption using RSA algorithm.

10. Write a program for the implementation of Diffie-Hellman key exchange algorithm.

11. Write a program to generate digital signature using Hash code.

12. Write a program to generate digital signature using MAC code.

13. Write a program for the implementation of Elliptic Curve point addition for polynomial basis form.

REFERENCE BOOKS:

1. William Stallings, *"Cryptography and Network Security"*, Pearson Education, 4th Edition, 2009.
2. Behrouz A. Forouzan, "*Cryptography and Network Security*", Tata McGraw-Hill, 2007.
3. Michael E. Whitman, Herbert J. Mattord, "*Principles of Information Security"*, Cengage Learning, 2008.
4. Bruce Schneier, "*Applied Cryptography* – Protocols, Algorithms and Source Code in C", John Wiley & Sons, Inc., 2nd Edition.
5. Christof Paar, Jan Pelzl, "*Understanding Cryptography*", Springer, 2009.

MCA V-SEMESTER

14MC50122: SOFTWARE TESTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES:

A Course on "Software Engineering"

COURSE OBJECTIVES:

I. To introduce the students about the importance of testing, methods and various test types.
II. To understand the need for automated software testing tools.
III. To test the various applications requirements like functional, non-functional using automated test tools.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

1. Analyze the problem definitions by using the system requirement specifications.
2. Design and develop various test condition and test cases for unit, integration, system test level.
3. Apply various research methodologies on testing approasches, bug reporting.
4. Apply different automated testing tools like QTP, LoadRunner, Rational Functional Tester.
5. Learn the many domains of testing like cloud, security, big data etc.. testing.
6. Manage the supporting and development projects.
7. Create detailed test cases and an effective test plan.

LIST OF LAB PROGRAMS

1. Identify Test Conditions for
   a) Automatic Cool drink vending machine
   b) Ceiling Fan
   c) Bank Account to Account Money Transfer
   d) Gmail-Registration
   e) Gmail- Compose mail

2.Design Test Cases for
   a) Bank Account to Account Money Transfer
   b) Gmail-Registration
   c) Gmail- Compose mail

3. a)Apply Normal, Analog and Low level recording modes for CALCULATOR Application.
   b)Apply Normal, Analog and Low level recording modes for FLIGHT Application.

4.
   a) Create a new project
   b) Create a new action
   c) Set action properties

d) Splitting actions

5. Analyze
   a) Local Object repository
   b) Shared Object repository

6. Work on below check point mechanisms on FLIGHT application
   a) Standard check point
   b) Bitmap check point
   c) Image check point
   d) Database check point

7. Apply various types (Data Table, Test/Action, Environment Variable) of rameterization

8. Apply Synchronization point (Data driven) on any application.

9. Apply object spying on FLIGHT application

8. Creation of virtual user Generation for various applications (Eg: Ez School)

9. Work with Load Generator on any of two applications

10. Create new project, Test Plan using Load Distribution

13. Track defects using two open source tools

REFERENCE BOOK:

1. Dr. K.V.K.K Prasad, "*Software Testing tools*," Dreamtech Press, Reprint Edition, 2007.

MCA V-SEMESTER

14MC50123: CLOUD COMPUTING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	-	*3*	-

PRE-REQUISITES:

Courses on "Computer Networks" and "Database Management System".

COURSE OBJECTIVES:

I. To provide knowledge on importance of Cloud computing, Cloud Security, Disaster Recovery and Cloud vendors.
II. To acquire skills on Virtualization Technologies such as VMware, Hyper-V.
III. To apply knowledge & skills of Cloud Computing programming in developing service oriented applications.
IV. To create attitude for maintaining security in different Cloud based applications.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire knowledge on services and types of infrastructural models in Cloud.
2. Gain problem solving to assess & improve quality attributes security, privacy concerns, and performance in Cloud Computing.
3. Apply the Cloud Architectures while developing the Web Applications. Design & Deploy common standard principles, practices, and methods for building Cloud based applications.
4. Inculcate ethical code of conduct in performing professional activities such as Storage, Services and Deploying of Cloud Computing applications.

LIST OF LAB PROGRAMS:

1. Installation of ESXi Hosts
   a. What is ESXi Server? Installation steps of ESXi Server.
   b. Assigning hostname, ip address, DNS & gateway.
2. Architecture of ESXi Host
   a.Architecture of ESXi Host.
3. Installation and Configuration of vSphere
   a. What is vSphere Client? Installation steps of vSphere Client.
   b. How to shutdown and Reboot ESXi Host from vSphere Client?
4. How to check syslog files?
5. Monitoring various tabs like summary, virtual machines, configuration, performance, events, local users, groups and ntp client
6. Installation and Configuration of Virtual Machines
   a. Creation of Virtual Machines.
   b. Installation of guest OS in Virtual Machines(VM's).
7. Installing VM Tools
8. Editing & Virtual Machine settings

9. Enabling Thin & thick provision
10. Understanding about Storage Devices
    a.Understanding DAS, NAS, SAN Storage Devices
11. Managing Virtual Networks and Switches

a. Creation of standard switches.
    b. Create port groups and vm kernel port

12. Installation and Configuration of Virtual Center Server(vCenter Server)

a. Installation of Windows 2008 Server on ESXi.
    b. Installation and Configuration of vCenter Server.

13. Data Center & Clustering
    a. Demonstration of High Availability
    b. Demonstration of V Motion
    c. Demonstration of Fault Tolerance
14. Demonstration of Distributed Resource Scheduler
15. Understanding and Managing Resource pool

REFERENCES:

1. www.vmware.com
2. www.softlayer.com

MCA – VI Semester

14MC60121: SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	50	50	-	-	-	2

PREREQUISITES: --

COURSE DESCRIPTION:

Identification of topic for the seminar; Literature survey; Preparation of technical report and presentation.

COURSE OBJECTIVES:

I. To impact knowledge on an advanced topic in the programme domain and interdisciplinary area through literature survey.
II. To facilitate students to explore and develop the following skills:
    a. Analysis
    b. Problem solving
    c. Research Methodologies, tools and techniques and
    d. Management and costing
III. To acquire knowledge and skills required for undertaking project work.
IV. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire in depth knowledge in core and allied area of interest.
2. Analyze and synthesize information related to the areas.
3. Conceptualize and construct research problems.
4. Extract information pertinent to specific area through literature survey to conduct research.
5. Identify the applicability of modern software and tools
6. Contribute positively to multidisciplinary groups in emerging area with objectively and relational analysis.
7. Plan, organize, prepare and present effective return and oral technical reports.
8. Engage in lifelong learning to improve competence.
9. Acquire awareness on professional core of conduct in the chosen area.
10. Develop independent and reflective learning

MCA – VI Semester

14MC60122: PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
80	120	200	-	-	-	12

PREREQUISITES: --

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation

COURSE OBJECTIVES:

I. To gain access to advanced knowledge on a chosen topic in the programme domain and inter-disciplinary areas through literature survey.
II. To develop analytical, problem solving, programming, design and development skills for effective project implementation.
III. To apply knowledge and skills to develop research competence in core and inter-disciplinary areas.
IV. To provide opportunity to work with a strong sense of professionalism in a specific area.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:

1. Acquire in-depth Knowledge in the areas of interest.
2. Analyze critically chosen project topic for conducting research.
3. Apply knowledge gained through programme, self-learning and experience for solution of a given problem efficiently.
4. Undertake research confidentially in the project domain.
5. Use the techniques, skills and modern engineering tools necessary for mini project.
6. Perform harmonically in multi-disciplinary and multi-cultural groups and develop a high level of inter-personal skills.
7. Manage projects in respective disciplines and multi-disciplinary environments with due consideration to cost and time efficiency.
8. Develop communication skills, both oral and written for preparing and presenting reports.
9. Engage in life-long learning to improve knowledge and competence continuously.
10. Understanding professional and ethical responsibility for sustainable development of society.
11. Develop independent and reflective learning.