

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

For

MASTER OF COMPUTER APPLICATIONS



**JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India**

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.
 - (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

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5. DataStructures Using C , A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/ Pearson.
 6. Programming in C , Stephen G. Kochan, III Edition, Pearson .
 7. Data Structures and Program Design in C, R.Kruse,, Tondo, Leung, Shashi M, 2nd Edition, Pearson.
 8. Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson , 2006
 9. C and Data Structures, Ashok N.Kamthane, Pearson.
 10. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

Interrupt Controller, Programmable Peripheral Interface Unit, DMA Based Data Transfer, Input/output (I/O) Processors, Bus Structure, Structure of a Bus Types of Bus, Bus Transaction Type , Timings of Bus Transactions, Bus Arbitration, some Standard Buses, Serial Data Communication, Asynchronous Serial data communication

TEXTBOOKS:

1. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
2. Digital Logic Design, Moriss Mano, PHI
3. Computer System Architecture, 3rd ed ., M. Morris Mano, PHI, 1994

REFERENCEBOOKS:

1. Computer Organization, 5th ed., Hamacher, Vranesic and Zaky, TMH, 2002
2. Computer System Organization & Architecture, John D. Carpinelli, Pearson, 2008
3. Computer System Organization, Naresh Jotwani, TMH, 2009
4. Computer Organization & Architecture: Designing for Performance, 7th ed.,

9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao et al., USP, 2009
10. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005
11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
13. Discrete Mathematics with Applications, Koshy, Elsevier, 2006.
14. Discrete Mathematics and its Applications, Rosen, 5th ed, T M Graw-Hill ed, 2006.
15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whitesides, Cengage., 2006.
16. Discrete Mathematical, Kevin Ferland, Cengage, 2008.
17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

TEXTBOOKS:

1. Probability, Statistics and Random Processes
Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies,
Deepti Publications.
2. Probability, Statistics and Random Processes , T.Veerarajan,
TMH, India

REFERENCEBOOKS:

1. Probability and Statistics for Engineers: Miller and Freund,
PHI.
2. Probability, Statistics and Queuing Theory Applications, 2nd
ed, Trivedi, John Wiley and Sons.

4. The 7 Habits of Highly Effective People – by Stephen Covey.
5. The Google Resume: How to Prepare of a Career and Land a Job at Apple, Microsoft.
6. Good English –by G.H Vallins
7. Better English – G.H Vallins
8. Best English – G.H. Vallins
9. How to Talk to Anyone: 92 little tricks for big success in Relationships by Leli Lowndes.
10. The leader in you - by Dale Carnegie
11. 250 Job Interview Questions You'll most likely Be Asked – by Peter Veruki, Peter Verki.
12. Contemporary English Grammar, structures and Composition - by David Green.

I	L	P	Credits
	-	3	-
COMPUTER PROGRAMMING DATA STRUCTURES LAB			

Objectives:

- To learn/strengthen a programming language like C, To learn problem solving techniques
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, etc.,

Recommended Systems/Software Requirements:

- Intel based desktop PC, ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C

Exercise 1.

- Write a C program to find the sum of individual digits of a positive integer.
- A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a program which checks a given integer is Fibonacci number or not.

Exercise 2.

- Write a C program to calculate the following Sum:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- Write a C program to find the roots of a quadratic equation.
- Write a C program to implement Newton Raphson method for a quadratic equation
- Write a C program to implement Newton Raphson method for a general purpose algebraic equation

Exercise 3

- Write C programs that use both recursive and non-recursive functions

- i) To find the factorial of a given integer.
- ii) To find the GCD (greatest common divisor) of two given integers.
- iii) To solve Towers of Hanoi problem.
- iv) Write program to calculate probability of head/tail by generating random numbers using random() function.

Exercise 4

- a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Exercise 5

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices
 - iii) Checking symmetry of a square matrix.
 - iv) Calculating transpose of a matrix in-place manner.

Exercise 6

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Exercise 7

- a) Write a C program that displays the position/ index in the string S where the string T begins, or -1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Exercise 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots\dots\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes $1+5+25+125$. Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Exercise 10

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11

Write a C program that uses functions to perform the following operations using Structure:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

Exercise 12

- 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.)

Exercise 13

- a) Write a C program that uses functions to perform the following operations on singly linked list.:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal
- b) Adding two large integers which are represented in linked list fashion.

Exercise 14

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

- i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

Exercise 15

- a.) Write C programs that implement stack (its operations) using
 - i) Arrays ii) Pointers iii) linked list.

Exercise 16

- a. Write C programs that implement Queue (its operations) using
 - i) Arrays ii) Pointers iii) linked lists.

Exercise 17

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

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

Exercise 18

- a. Write a C program that uses functions to perform the following:
 - i) Creating a Binary Tree of integers
 - ii) Traversing the above binary tree in preorder, inorder and postorder.
- b. Program to check balance property of a tree.
- c. Program to check for its strictness.

Exercise 19

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

Exercise 20

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i) Bubble sort ii) Quick sort

Exercise 21

- a. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Insertion sort
 - ii) Bubble sort
- b. Recursive implementation of sorting algorithms.

Exercise 22

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Exercise 23

- a. Program to calculate mean and standard deviation of a population.
- b. Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 24

- a. Write C programs to implement Trapezoidal and Simpson methods. and
- b) Program for Calculating pi value.

REFERENCEBOOKS:

1. Digital Fundamentals, Floyd, Jain, 8th ed , Pearson
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

I	L	P	Credits
	-	3	-

**DIGITAL LOGIC AND COMPUTER SYSTEMS
ORGANIZATION (DLC SO) LAB**

Exercise 1

Boolean Algebra: Theorems and logical guides, verification of truth tables

Exercise 2

Realization of Boolean expressions ; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates

Exercise 3

Latches Flip – Flops : RS, JK, T, D, Master – Slave FF, Edge – Triggered Flip – Flops

Exercise 4

Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

Exercise 5

Modulo Counter: Modulo - 5, Modulo – 10

Exercise 6

Adders / Sub tractors: Half Adder, Full Adder, 1 ‘s and 2’s complement addition

Exercise 7

Multiplexers/ Data Selector : 2- input and 8- input, Demultiplexers , Logic Function Generator

Exercise 8

Decoders and Encoders

Exercise 9

BCD adders and Comparators

Exercise 10

Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/ POSR

Exercise 11

Johnson Counter, Sequence Generator, Parity Generators/ Checkers

Exercise 12

Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal, BCD- to –Decimal, Binary – to- gray, gray- to - Binary

Exercise 13

Buffers / Drivers : Open ; collector Buffers

Exercise 14

Gates : CMOS / NMOS/TTL – Basic Operational Characteristics and parameters

Exercise 15

RAM, ROM, PROM, EPROM – Testing Memory Chips

REFERENCEBOOKS

1. Digital Fundamentals, Floyd & Jain , Pearson , 2005.
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

II	L	P	Credits
	4	-	-
OOPS THROUGH JAVA			

UNIT-I

Basics of Object Oriented Programming(OOP): Need for OO paradigm , A way of viewing world- Agents, responsibility, messages,methods,classes and instances, class hierarchies(Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity , abstraction mechanisms

Java Basics: Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects- concepts of classes, objects, constructors methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II

Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, sombination, benifits of inheritance costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

Packages and Interfaces: Defining, Creating and Accessing a package, Understanding CLASSPATH,Importing packages, differences between classes and interfaces, defining an interface, Implementing interface, applying interfaces variables in interface and extending interfaces.

UNIT-III

Exception handling and Multithreading: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-IV

Event Handling: Events, Event sources, Event classes, Event Listeners,

Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy , user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, list panes- scrollpane, dialogs, menubar, graphics, layout manager- layout manager types- boarder, grid, flow, card and grid bag.

UNIT-V

Applets: Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons-The JButton class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

TEXTBOOKS:

1. Java-The complete reference,7/e, Herbert schildt, TMH.

REFERENCES:

1. JAVA:How to program, 8/e, Dietal , Dietal,PHI.
2. Introduction of programming with JAVA,S.Dean,TMH.
3. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson.
4. Core Java 2, Vol 1(Vol 2) Fundamentals(Advanced), 7/e, Cay.S.Horstmann,Gary Cornell, Pearson.
5. Big Java2,3/e, Cay.S. Horstmann,Wiley.
6. Object Oriented Programming through Java, P.Radha Krishna, University Press.
7. JAVA&Object Orientation an Introduction, 2/e, John Hunt, Springer.
8. Introduction to JAVA Programming, 7/e, Y.Daniel Liang, Pearson.
9. AVA Programming and Object –Oriented Application Development , Johnson, Cengage Learning.
10. First Encounter with JAVA, S.P.Bhuta, SPD
11. JAVA for Professionals , B.M.Harwani, SPD.
12. Program with JAVA, Mahesh Bhave, Palekan, Pearson.
13. Programming with JAVA, 3/e, E.Balaguruswamy, TMH.

II	L	P	Credits
	4	-	-
OPERATING SYSTEMS			

UNIT-I:

Introduction: Computer –system organization, Computer- system Architecture, Operating- system Structure, Operating-system Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special- purpose systems, Computing Environments , Operating-system Structure: , Operating-system Services, User , Operating-system Interface, System calls, System programs, Operating-system Design and Implementation, , Operating-system structure, Virtual Machine

UNIT-II:**Process Management:**

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems, Communication in Client-Server systems

Threads: Overview, Multithreading Models, Thread Libraries, Java Threads, Threading Issues, OSExamples

CPU Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Operating system Examples

Process Synchronization: Background, The Critical- section problem, Petersons solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors, Atomic Transactions.

UNIT-III:

Memory management: Main memory: Swapping, Contiguous memory Allocation, Paging, Structure of the Page table, Segmentation

Virtual memory: Background, Demand paging, copy-on-Write, Page Replacement, Allocation of frames, Thrashing, Memory-Mapped Files.

UNIT-IV:

File-system Interface: Concept, Access Methods, Directory structure, File-system Mounting, File sharing, Protection

File-system Implementation: File-system Structure, Implementation,

Directory Implementation, Allocation Methods, Free- Space Management, Efficiency and Performance, Recovery, Log-Structured File systems, NFS Mass –storage Structure: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and swap-space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure
 I/O systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O requests to Hardware Operations, STREAMS, Performance.

UNIT-V:

Deadlocks: System model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance Deadlock Detection and Recovery form Deadlock.

Protection: Goals of Protection, Principles of protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability –Based systems, Languge-Based Protection

Security: The Security Problem, Program Threads, System and Network Threats, Cryptography as a security tool, User Authentication, Implementing security Defenses, Firewalling to protect systems and Networks.

TEXTBOOKS:

1. Operating system concepts, 7/e, Abraham Siliberschatz, Galvin, John Wiley &sons , Inc.

REFERENCES:

1. Operating systems,6/E,William stallings, PHI/Pearson.
2. Operating systems 3/e,Dietal ,Dietal,Pearson.
3. Operating systems, 2/e, Dhamdhare, TMH.
4. An introduction to Operating systems, Concepts and practice, Pramod Chandra P.Bhat, PHI
5. Operating systems, Elmasri, Carrick, Levine, TMH.
6. Operating systems ,3/e ,Nutt, Chaki, Neogy, Pearson.
7. Operating systems, Brian L. Stuart, Cengage.
8. Operating systems, Haldar, Aravind, Pearson.
9. Operating systems, PAL Choudhury, PHI.
10. Operating systems :design and Implementation, 3/e, Tanenbaum, Woodhull.

II	L	P	Credits
	4	-	-

ORGANIZATIONAL STRUCTURE AND HUMAN RESOURCE MANAGEMENT

UNIT – 1

Introduction to Management :

Concepts, nature and definitions of management – management and administration, principles of management - functions of management- planning, organizing, directing and controlling – importance of management.

UNIT – II

Classical Theories of Organization:

Functional approach – division of labor, levels of authority, span of Control, authority & responsibility, efficiency of management.

Concept of organization structure- Formal and Informal organization, difficulties due to informal organization- group behaviour- Committee- motivation and theories of motivation.

UNIT – III

Human Resource Management:

Objectives, functions of HRM, duties and responsibilities of HR manager- position of HR department in the organization- Changing, concept of personnel management in India. Job Description, recruitment, job specification and selection, interviewing techniques, transfers, promotion and its policies

Trainings and Development: Objectives of training – identifying trainings needs – training methods- on the job training – off the job training – job evolution- training function India- State-of – Art- survey

UNIT – IV

Communication:

Importance of communication, communication process- methods of communication two way communication, barriers of Communication, organizational barriers – essentials of effective Communication system

UNIT-V**Strategic Management:**

Introduction –study of strategic management – environmental scanning-internal environment and external environment-SWOT analysis- challenges’ in LPG

REFERENCES:

1. Organization Structure and personal Management, 2/e, Subbarao. P, HPH.
2. personal and Human Resource Management, Recenzo, Robins, PHI.
3. Business Communications and soft skills, kuberudu B, and Krishna K.s, Excel publications.
4. Management process and Organizational Behaviour, karam pal, I.k.int.
5. Management process and Organizational Behaviour, karam pal, I.K int.
6. Human Resource Management Jyothoi, Oxford.
7. Organizations and Management, Agarwal, TMH.
8. Fundamentals of HRM, David A. Decenzo, Stephen R. Robins, Wiley India.
9. Organizational Structure and Human Resurce management, Varaprasad, SciTech.
10. Human Resource Management, Chabra. T.N, Dhanpat Rai.
11. Personal Management and Human Resources, Venkat Ratnam, TMH,

II	L	P	Credits
	4	-	-
OPTIMIZATION TECHNIQUES			

UNIT-I

Development: Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes. Allocation: introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle.

UNIT-II

Transportation problem: Formulation, optimal solution, unbalanced transportation, assignment problem: formulation, optimal solution, variations problem, degeneracy i.e. non square $M \times N$ matrix, restrictions sequencing: Introduction, optimal solution for processing each of n jobs through three machines, travelling salesman problem(i.e.) shortest acyclic route models.

UNIT-III

Replacement: Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements. Waiting lines: Introduction, single channel, poisson arrivals, exponential service time infinite population and unrestricted queue.

UNIT-VI

Inventory: Introduction, single item, deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and with draws from stock is continuous, purchase inventory model with one price break, shortages are not allowed, instantaneous production demand production or purchase cost is relevant, stochastic models, simple problems.

UNIT-V

Theory of Games: Introduction, minmax(maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle

points. Dynamic programming: Introduction, Bellman's Principle of optimality, solutions for simple problems.

Project Management: PERT and CPM , difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities.

TEXTBOOKS:

1. Operations Research, S.D.Sharma, Ramnath,& Kedarnath co, Meerut.
2. Operations Research, An introduction , 8/e, Taha, Pearson.

REFERENCES:

1. Operations Research, P.K.Gupta, D.S. Hira, S.Chand.
1. Operations Research, R.D.Asrhedkar, R.V.Kulkarni.
2. Operations Research, Problems & sollutons, 3/e, JKSharma, Macmillan.
3. Operations Research, 8/e, Hillier, Liberman, TMH.
4. Operations Research, 2/e, Panneerselvam.

II	L	P	Credits
	4	-	-
BUSINESS DATA PROCESSING			

UNIT-I

Introduction to data processing, types of data processing, Overview of COBOL: History of COBOL, Coding formats of a COBOL program, Structure of a COBOL program, Character set, Cobol words, data names and identifiers, literals, figurative constants, hierarchy of COBOL statements, continuation of lines, language description notation, implementation differences.

Introduction to divisions(Identification, environment, data and procedure divisions),Format and functions of the different sections and paragraphs in each division.

UNIT-II

Data Division:Level structure(including special level Nos.66,77 and 88, picture clause, editing characters, concept of qualification of names, record structure, working storage section: VALUE clause, REDEFINES clause, RENAMES clause, USAGE clause, SIGN clause, JUSTIFIED clause, SYNCHRONIZED clause.

UNIT-III

Procedure division : Organization of a COBOL program: Section, Paragraph, sentence, Statement, syntax and function of the different COBOL verbs.

Elementary verbs: add, subtract, multiply, divide and compute.

Input-Output verbs: Accept, display.

Data movement: move verb

Conditional and sequence control verbs:

Types of conditions, condition name, condition, relation condition, class condition, sign condition, Relational operators, Logical operators, if and nested if statements, complex conditions, evaluation roles, abbreviated, compound conditions, EVALUATE statements, ALTER statement.

Miscellaneous verbs: GOTO,STOP,RUN, EXIT, CONTINUE.

Perform-verb:In-line and Out-Line PERFORM, Types of Out-line , PERFORM, PERFORM-UNITL, PERFORM -VARIYING,PERFORM -THRU,PERFORM-

TIMES, Usage of TEST BEFORE and TEST AFTER clauses, nested PERFORM.

UNIT-IV

Table handling: basic concepts, OCCURS clause, Assigning values to table elements, single, multiple dimensional table, INDEX/SUBSCRIPT, SET verb: indexed by clause, usage in index clause, SEARCH concepts, SEARCH verb, serial/ binary searching in COBOL, Handling sorted/ unsorted tables. String handling in COBOL: STRING statement, EXAMINE statement, INSPECT statement, UNSTRNG statement.

UNIT-V

File Handling: Basic file concepts, Characteristics, File Description, File Organization/access, file section and file control paragraphs, Sequential indexed and relevant file handling in COBOL, USE statement

Input- output Statements: open, close, read, write, rewrite, delete, start.

Compiler directing verb: Copy.

Sorting and Merging: Basic concepts, SORT verb, MERGE verb.

Inter –program communication: Basic concepts, subroutines, Linkage section, call verb, call by address and call by content.

Screen section, Report Writing.

TEXT BOOKS:

1. COBOL Programming, D.Ghosh Dasthidar, M.K.Roy, TMH.
2. Structured COBOL, Phillipakis, Kazmier, MGH.

REFERENCES:

1. Structured COBOL programming , 8/e, Stern, A.Stern, wiley.
2. COBOL for beginners, Worth, Thomas, PHI.

II	L	P	Credits
	-	3	-

OOPS THROUGH JAVA LAB

1. Use JDK 1.5 or above on any platform e.g. Windows or Unix.
2. Student is expected to complete any 16 programs.
 1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1,1.every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WJJP) that uses both recursive and nonrecursive functions to print the nth value of the Fibonacci sequence.
 2. WJJP to demonstrate wrapper classes and to fix the precision.
 3. WJJP that prompts the user for an integer and then prints out all the prime numbers upto that Integer.
 4. WJJP that checks whether a given string is a palindrome or not. Ex. MALAYALAM is a palindrome.
 5. WJJP for sorting a given list of names in ascending order.
 6. WJJP to check the compatibility for multiplication , if compatible multiply two matrices and find its transpose.
 7. WJJP that illustrates how runtime polymorphism is achieved.
 8. WJJP to create and demonstrate packages.
 9. WJJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.
 10. WJJP that reads on file name form the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.
 11. WJJP that displays the number of characters, lines and words in a text/text file.
 12. Write an Applet that displays the content of a file.
 13. WJJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +-*?% operations. Add a text field to display the result.
 14. WJJP for handling mouse events.

15. WAJP demonstrating the life cycle of a thread.
16. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
17. WAJP that lets users create Pie charts. Design your own user interface(with Swings & AWT).
18. WAJP that allows user to draw lines, rectangles and ovals.
19. WAJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data send form the client is the radius of a circle and the result produced by the server is the area of the circle.
20. WAJP to generate a set of random numbers between two numbers x_1 and x_2 , and $x_1 > 0$.
21. WAJP to create an abstract class named shape, that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method numberOfSides(), that contains the number of sides in the given geometrical figure.
22. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).
23. WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable).
24. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviours, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

II	L	P	Credits
	-	3	-
BUSINESS DATA PROCESSING LAB			

All the programs should be implemented in COBOL language. The standards that can be used are COBOL-68, COBOL-74, COBOL-85, MS-COBOL, COBOL 2002. The operating systems that can be used are :IBM's z/OS, Microsoft's Windows, and the POSIX families (Unixx/Linux etc.)etc. At least two programs from each set of 9.

1. **Beginners Programs-** Simple programs using ACCEPT, DISPLAY and some arithmetic verbs.
 1. Program illustrating usage of editing characters.
 2. Programs for simplification the following equations using
 - a) Arithmetic Verbs b) COMPUTE verb
 the equations are i) $C=(5/9)(F-32)$ ii) $A=\delta r^2$
2. **Selection and Iteration-** selection (IF,EVALUATE) and Iteration (PERFORM) example programs.
3. **Tables-**Example programs using tables.
 1. Program that determines the multiplication on two matrices.
 2. Programs for performing linear search and Binary search operations.
4. **String handling-**Example programs that show how to use Reference Modifications, STRING, UNSTRING INSPECT and UNSTRING.
 1. A data item Name contains 4 characters. Write a program to change all instances of "MR" or "Mr" by "Sri" and "MRS" or "Mrs" by "Smt".
5. **Sequential Files:** Programs that demonstrate how to process sequential files.
 1. Develop a program to maintain and process a sequential file to generate electrical bills. The bill should have the following details. APSEB, House Number, Operator, Owner's name, Zone, Category, previous meter reading, unit charge, total.
 2. Program to merge files and print the merged files. Take input form user.

3. Write a program which accepts student's details from a file and displays them along with grades. Input file should have details regarding Roll-no and marks in three subjects. Output file format should be

Name	RollNo	Maths	Physics	Computers	Total	Grade
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6. **Sorting and Merging**-Examples that use INPUT PROCEDURE'S and the SORT and the MERGE verbs.
 - Write sample programs for sorting and merging of sequential files using SORT and MERGE verbs.
7. **Direct Access Files**-Examples programs that show how to process Indexed and Relative files.
 1. Write a program that performs the conversion of sequential data to indexed data.
 2. Write a program which converts the given sequential file into relative file.
 3. Develop a program to maintain and generate bills in a supermarket. The master file is maintained as indexed organization with fields item -code, item-name, unit-price. Generate bills for customers with the random requests about items as common in any super market in the following Format..

S.No.	code	Description	Unit Price	Qty	Total
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Total Amount:

8. **CALLing sub-programs**-Example programs that Demonstrate contained, and external, sub-programs-sample programs illustrating Linkage section.
9. **The COBOL Report Writer**-Example programs using the COBOL Report Writer.
 1. Simple report using only one control break.
 2. Report containing all the control breaks but not using declaratives.
 3. Report containing all control breaks and using declaratives to calculate the sales person salary and commission.

III	L	P	Credits
	4	-	-
DATA BASE MANAGEMENT SYSTEMS			

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems. Introduction to Data base design, ER diagrams, Beyond ER Design, 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, Introduction to Views – Destroying /altering Tables and Views.

UNIT II

Relational Algebra and Calculus: Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL 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.

UNIT III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND,

THIRD Normal forms – BCNF – Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

UNIT IV

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to 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

UNIT V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A. Silberschatz, H.F. Korth, S. Sudarshan, McGraw hill, VI edition, 2006.

3. Fundamentals of Database Systems 5th edition., Ramez Elmasri, Shamkant B.Navathe,Pearson Education,2008.

REFERENCE BOOKS:

1. Database Management System Oracle SQL and PL/SQL,P.K.Das Gupta,PHI.
2. Database System Concepts,Peter Rob & Carlos Coronel,Cengage Learning,2008.
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed.,ELSEVIER
5. Fundamentals of Relational Database Management Systems,S.Sumathi,S.Esakkirajan, Springer.
6. Introduction to Database Management,M.L.Gillenson and others,Wiley Student Edition.
7. Database Development and Management, Lee Chao,Auerbach publications,Taylor & Francis Group.
8. Introduction to Database Systems,C.J.Date,Pearson Education.

III	L	P	Credits
	4	-	-
COMPUTER COMMUNICATIONS			

UNIT-I

Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

The data Link layer : Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window protocols : Data link layer in HDLC, Internet and ATM.

UNIT-II

Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard 802 for LANs – Ethernet, Token Bus, Token ring, Bridges.

Network Layer Routing Algorithms: Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention policies, Choke packets and Load shedding.

UNIT-III

Internet Working : Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, OSPF, BGP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

UNIT-IV

The Transport Layer: Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols : UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

UNIT-V

Application Layer: Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms : Authentication Protocols, Firewalls. Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications : SMTP, MIME, World Wide Web : HTTP, Network Management : SNMP.

TEXT BOOKS :

1. Computer Networks and rew, Tanenbaum, 4/e, Pearson
2. Data and computer communications, stallings, 8/e, PHI

REFERENCE BOOKS

1. Data communications and networking Forouzan, 4/e, TMH
2. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/e,Harcourt Asia
3. Compute communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
6. Computer networks , Anuranjan Misra, ACME Learning
7. Computer networks, C R Sarma, Jaico, Understanding data communications, Held, 7/e , Pearson

III	L	P	Credits
	4	-	-
UNIX PROGRAMMING			

UNIT-I

Review of Unix Utilities and Shell Programming: -File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell-, What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT-II

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, octl, umask, dup, dup2. The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

UNIT-III

Unix Process:Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management, -fork, vfork, exit, wait, waitpid, exec, system, Threads, -Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, cancelling a thread, threads vs. processes, Signals-, Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT-IV

Data Management: Management Memory (simple memory allocation, freeing memory) file and record locking (creating lock files, locking regions, use of

read/ write locking, competing locks, other commands, deadlocks).

Interprocess Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC (system-V)- message queues, semaphores and shared memory.

Message Queues-: IPC, permission issues, Access permission modes, message structure, working message queues, Unix system-V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

UNIT-V

Semaphores: -Unix system-V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores.

Shared Memory: -Unix system-V shared memory, working with a shared memory segment, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example.

Sockets: Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example- client/server program, advanced socket system calls, socket options.

TEXT BOOKS:

1. Unix and shell Programming, N B Venkateswarlu, Reem
2. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

REFERENCE BOOKS:

1. Unix and shell Programming, Sumitabha Das, TMH
2. A Beginner's Guide to Unix, N.P.Gopalan, B.Sivaselva, PHI
3. Unix Shell Programming, Stephen G.Kochan, Patrick Wood, 3/e, Pearson
4. Unix Programming, Kumar Saurabh, Wiley,India
5. Unix Shell Programming, Lowell Jay Arthus & Ted Burns,3/e, GalGotia
6. Nix Concepts and Applications, Das, 4/e, TMH

III	L	P	Credits
	4	-	-
MANAGEMENT INFORMATION SYSTEMS			

UNIT-I

Management Information Systems: A Framework: Importance of MIS , MIS: A Definition

ature and Scope of MIS , **Structure and Classification of MIS :** Structure of MIS, MIS Classification

Information and System Concepts: Information: A Definition, Types of Information, Dimensions of Information, System: A Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System

Information Systems for Competitive Advantage: Introduction, Changing concepts of Information System, Competitive Advantage, Information systems Strategies for Dealing with competitive Force, Porter's Value Chain Model, Strategic Information Systems (SIS)

UNIT-II**BUSINESS APPLICATIONS OF IS**

e – Commerce : Introduction, e – Commerce

ERP Systems : Introduction, Enterprise Information Systems

Decision – Support Systems: Decision – Making: A Concept, Simon's Model of Decision - Making

Types of Decisions, Methods for Choosing Among Alternatives, Decision – Making and MIS, Decision Support Systems – Why?, Decision Support Systems: A framework, Characteristics and Capabilities of DSS

Business Intelligence and knowledge Management System : Business Intelligence, Knowledge Management System

UNIT-III

Information System Planning : Information System Planning: WHY?, Planning Terminology

Information System Planning, The Nolan Stage Model, The Four – Stage Model of is planning

Selecting A Methodology, Information Resources Management (IRM), Organisation Structure and Location of MIS

System Acquisition : Acquisition of Information Systems , Acquisition of Hardware and Software

UNIT – IV

System Implementation: IMPLEMENTATION PROCESS, Organisational Change

Evaluation & Maintenance of IS : Evaluation of MIS , System Maintenance

IS Security and Control: IS Security Threats, Protecting Information System, IS Security Technology

The Disaster Recovery Plan

UNIT – V

BUILDING OF IS

System Development Approaches: System Development Stages, System Development Approaches

System Analysis and Design: SYSTEM ANALYSIS - Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools

SYSTEMS DESIGN: Design Objectives , Conceptual Design , Design Methods, Detailed System Design

TEXT BOOKS:

1. Management Information System, Managerial Perspectives, D P Goyal, 3 ed, McMillan Publications

III	L	P	Credits
	4	-	-
DESIGN AND ANALYSIS OF ALGORITHMS			

UNIT-I:

Introduction: Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi-connected components.

UNIT-II:

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III:

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT-IV:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V:

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, Springer.
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.

REFERENCE BOOKS:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu BALachandra Dave, Pearson Education.
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

III	L	P	Credits
	-	3	-
DBMS Lab			

1. Execute a single line and group functions for a table.
 2. Execute DCL and TCL Commands.
 3. Create and manipulate various DB objects for a table.
 4. Create views, partitions and locks for a particular DB.
 5. Write PL/SQL procedure for an application using exception handling.
 6. Write PL/SQL procedure for an application using cursors.
 7. Write a DBMS program to prepare reports for an application using functions.
 8. Write a PL/SQL block for transaction operations of a typical application using triggers.
 9. Write a PL/SQL block for transaction operations of a typical application using package.
 10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
 11. Create table for various relation
 12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
 13. Creating Views
 14. Writing Assertion
 15. Writing Triggers
 16. Implementing operation on relation using PL/SQL
 17. Creating Forms
 18. Generating Reports
- Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

III	L	P	Credits
	-	3	-

UNIX PROGRAMMING LAB

1. Program using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process cots : sniffer
5. Program using TCP sockets (Client and Server)
6. Program using UDP sockets (Client and Server)
7. Program using URL class to download webpages
8. Write a shell script for sorting, searching and insertion/deletion of elements in a list
9. Create two processes to run a for loop, which adds numbers 1 to n, say one process adds odd numbers and the other even
10. By creating required number of processors, simulate a communication between them as below:
11. Create a file that is shared among some users, write a program that finds whether a specific user has created read and write operations on the file
12. Create a shared lock and exclusive lock among some number of processes, say 1 to 10 on any data of 100 elements. For example, process 5 wants a shared lock on elements 5 to 50 or process 8 wants exclusive lock on elements 32 to 45. Create access violations on the locks and show what occurs, then.
13. Write a program demonstrating semaphore operation on a shared file for reading but not writing
14. Create a distributed key among some processes which exchange messages of the form (m, Ti, I) for resource sharing, where m=request, reply, release, Ti=time stamp and I=process id
15. Write a program demonstrating mutual exclusion principle
16. Write a program which reads a source file name and destination file

name using command line arguments and then converts into specified format (i.e. either from lower case to upper case or upper case to lower case or inverse of each)

17. Write a program which takes a set of filenames alongwith the command line and print them based on their size in bytes either ascending or descending order
18. Write a program which takes directory name along the command line and displays names of the files which are having more than one link
19. Write a program to demonstrate the use of temporary files
20. Write a program to demonstrate the use of exec family functions
21. Write a program to display the good morning, good afternoon, good evening and good night depending on the users log on time
22. Write a program to demonstrate the working of simple signal handler that catches either of the two user defined signals and prints the signal number
23. Write a program to demonstrate the locking mechanism while accessing the shared files
24. Write a shell script containing a function mycd() using which, it is possible to shuttle between directories
25. write a shell script which works similar to the wc command. This script can receive the option -l, -w, -c to indicate whether number of lines/ words/characters
26. Write a program to print prime numbers between x and y Write a shell script which deletes all lines containing the word
27. Write a shell script which deletes all lines containing the word "UNIX" in the files supplied as arguments to this shell script
28. Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions
29. Write a menu-driven program which has the following options:
30. Write a shell script for renaming each file in the directory such that it will have the current shell's PID as an extension. The shell script should ensure that the directories do not get renamed
31. Write a program which demonstrates the shared memory functions

IV	L	P	Credits
	4	-	-
SOFTWARE ENGINEERING			

UNIT – I**Introduction to Software Engineering:**

The evolving role of software, Changing Nature of Software, Software myths.
(Text Book 3)

The software problem: Cost, schedule and quality, Scale and change.

UNIT – II**Software Process:**

Process and project, component software process, Software development process models : Waterfall model, prototyping, iterative development, relational unified process, time boxing model, Extreme programming and agile process, using process models in a project. Project management process.

UNIT - III

Software requirement analysis and specification: Value of good SRS, requirement process, requirement specification, functional specifications with use-cases, other approaches for analysis, validation.

Planning a software project: Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT – IV

Software Architecture: Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

Design: Design concepts, function-oriented design, object oriented design, detailed design, verification, metrics

UNIT-V

Coding and Unit testing: Programming principles and guidelines, incrementally developing code, managing evolving code, unit testing, code inspection, metrics.

Testing: Testing concepts, testing process, black-box testing, white-box testing, metrics.

TEXT BOOKS:

1. A Concise introduction to software engineering (undergraduate topics in computer science), Pankaj Jalote, Springer International Edition.
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
3. Software Engineering, 3/e ,& 7e Roger S.Pressman , TMH

REFERENCE BOOKS:

1. Software Engineering, 8/e, Sommerville, Pearson.
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

IV	L	P	Credits
	4	-	-
ADVANCED JAVA FOR WEB TECHNOLOGIES			

UNIT-I

Review of HTML4 : Common tags ,HTML Tables and formatting internal linking, Complex HTML forms.

Introduction to Scripting Languages: Java Scripts, Control structures, functions, arrays & objects, DHTML, CSS, event model, filters & transitions.

UNIT-II

Review of Applets, Class, Event Handling, AWT Programming:

Introduction to Swing: Japplet, Handling Swing Controls like Icons, Buttons, Text Boxes, Combo Boxes, Tabbed Pains, Scroll Pains, Trees, Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing.

UNIT-III

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API.

Introduction to Servelets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization Parameters, The javax.servlet.HTTP package, Handling, Http Request & responses, Using Cookies, Session Tracking, Security Issues.

UNIT-IV

Introduction to JSP: The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.

Setting Up the JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

JSP Application Development: Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests,

and Users, Passing Control and Data Between Pages – Sharing Session and Application Data Memory Usage Considerations.

UNIT-V

Database Access: Database Programming using JDBC, Studying Javax.sql.* package. Accessing a Database from a JSP Page, Application – Specific Database Actions Deploying JAVA Beans in a JSP Page.

TEXT BOOKS:

1. Internet and World Wide Web: How to program,6/e, Dietel, Dietel, Pearson.
2. The Complete Reference Java2, 8/e, Patrick Naughton, Herbert Schildt, TMH.
3. Java Server Faces, Hans Bergstan, O’reilly.

REFERENCE BOOKS:

1. Web Programming, building internet applications, 2/e, Chris Bates, Wiley Dreamtech
2. Programming world wide web, Sebesta, PEA
3. Web Tehnologies, 2/e, Godbole, kahate, TMH
4. An Introduction to web Design , Programming ,Wang,Thomson

IV	L	P	Credits
	4	-	-
DATA WAREHOUSING AND DATA MINING			

UNIT-1

Introduction to Data mining, types of Data, Data Quality, Data Processing, Measures of Similarity and Dissimilarity, Exploring Data: Data Set, Summary Statistics, Visualization, OLAP and multi dimensional data analysis.

UNIT-II

Classification: Basic Concepts, Decision Trees and model evaluation: General approach for solving a classification problem, Decision Tree induction, Model over fitting: due to presence of noise, due to lack of representation samples, Evaluating the performance of classifier. Nearest Neighborhood classifier, Bayesian Classifier, Support vector Machines: Linear SVM, Separable and Non Separable case.

UNIT-III

Association Analysis: Problem Definition, Frequent Item-set generation, rule generation, compact representation of frequent item sets, FP-Growth Algorithms. Handling Categorical, Continuous attributes, Concept hierarchy, Sequential, Sub graph patterns

UNIT-IV

Clustering: Over view, K-means, Agglomerative Hierarchical clustering, DBSCAN, Cluster evaluation: overview, Unsupervised Cluster Evaluation using cohesion and separation, using proximity matrix, Scalable Clustering algorithm

UNIT-V

Web data mining: Introduction, Web terminology and characteristics, Web content mining, Web usage mining, web structure mining, Search Engines :Characteristics, Functionality, Architecture, Ranking of WebPages, Enterprise search

TEXT BOOKS:

1. Introduction to Data Mining: Pang-Ning tan, Michael Steinbach, Vipin kumar, Addison- Wesley.
2. Introduction to Data Mining with Case Studies: GK Gupta; Prentice Hall.

REFERENCE BOOKS:

1. Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson, 2008.
2. Fundamentals of data warehouses, 2/e , Jarke, Lenzerini, Vassiliou, Vassiliadis, Springer.
3. Data Mining Theory and Practice, Soman, Diwakar, Ajay, PHI, 2006.
4. Data Mining , Concepts and Techniques, 2/e, Jiawei Han, Micheline Kamber, Elsevier, 2006.

IV	L	P	Credits
	4	-	-
(ELECTIVE I) MOBILE COMPUTING			

UNIT-I:

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, Handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices

UNIT-II:

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture.

Wireless medium access control, CDMA, 3G, and 4G communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-2000 3G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks.

UNIT-III:

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP

Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT-IV:

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server

UNIT-V:

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

TEXT BOOK:

1. RAJ KAMAL, "Mobile Computing," second edition, Oxford.
2. ASOKE K TALUKDER, HASAN AHMED, ROOPAR YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
3. UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer

IV	L	P	Credits
	4	-	-
(ELECTIVE I)			
HUMAN COMPUTER INTERACTION			

UNIT-I

Introduction: Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

The graphical user interface: Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user –interface popularity, characteristics- Principles of user interface.

UNIT-II

Design process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT-III

Screen Designing : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT-IV

Windows: Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

Components : Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT-V

Software tools : Specification methods, interface, Building Tools.

Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXT BOOKS :

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004.
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOKS :

1. Designing the user interface. 4/e, Ben Shneidermann , PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
4. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

IV	L	P	Credits
	4	-	-
(ELECTIVE I) ERP & SUPPLY CHAIN MANAGEMENT			

UNIT-I

Introduction to ERP: Overview – Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining – On-line Analytical Processing, Supply Chain Management.

ERP Implementation: Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring.

UNIT-II

Business Modules: Business Modules in an ERP Package , Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

Fundamentals of Supply Chain Management:

Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT-III**SCM Strategies, Performance:**

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT-IV**Planning and Managing Inventories:**

Introduction to Supply Chain Inventory Management. Inventory theory

TEXT BOOKS:

1. Software testing techniques - Boris Beizer, International Thomson computer press, second edition.
2. Software Testing- Yogesh Singh, CAMBRIDGE

REFERENCE BOOKS:


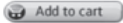

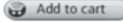



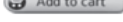
1. Introduction to Software Testing, Paul Amman, Jeff Offutt, CAMBRIDGE
2. Effective Software testing, 50 Specific ways to improve your testing, Elfriede Dustin, PEA

3) CATALOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE		Book : XML Bible Author : Winston Publication : Wiley	\$ 40.5	
ECE		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	
EEE		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	
CIVIL		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	\$ 50	

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) **CART PAGE:** The cart page contains the details about the books which are added to the cart. The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	Book name	Price	Quantity	Amount
ECE	Java 2	\$35.5	2	\$70
EEE	XML bible	\$40.5	1	\$40.5
CIVIL	Total amount -			\$130.5

5) REGISTRATION PAGE:

Create a “*registration form*” with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

- 2) Set a background image for both the page and single elements on the page.

BODY {background-image:url(myimage.gif);}

You can define the background image for the page like this:

- 3) Control the repetition of the image with the background-repeat property.

As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

- 4) Define styles for links as

A:link

A:visited

A:active

A:hover

Example:

```
<style type="text/css">
```

```
A:link {text-decoration: none}
```

```
A:visited {text-decoration: none}
```

```
A:active {text-decoration: none}
```

```
A:hover {text-decoration: underline; color: red;}
```

```
</style>
```

- 5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
```

```
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
```

```
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:4">LAYER 2</div>
```

- 6) Add a customized cursor:

```
Selector {cursor:value}
```

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

Week-6:

VISUAL BEANS:

Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the “property window“.

Week8.

Design a TCP concurrent server to echo given set of sentences using poll functions

Week9.

Design UDP Client and server application to reverse the given input sentence

Week10

Design UDP Client server to transfer a file

Week11

Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.

Week12

Design a RPC application to add and subtract a given pair of integers

REFERENCEBOOK:

1. Advance Unix Programming Richard Stevens, Second Edition Pearson Education
2. Advance Unix Programming, N.B. Venkateswarlu, BS Publication.