### SCHEME OF INSTRUCTION AND EVALUATION
#### II SEMESTER OF II YEAR OF 4-YEAR B.TECH. DEGREE PROGRAMME

**COMPUTER SCIENCE AND ENGINEERING**

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UNIT – I (9+3)
MATRICES : Rank of a matrix - Solution of system of linear equations - Linear dependence and independence of vector – Characteristics roots and Characteristics vectors of a matrix-Cayley Hamilton Theorem (without proof) - Reduction to diagonal form and normal form. Reduction of a quadratic form to canonical form.

UNIT – II (9+3)

UNIT – III (9+3)

UNIT – IV (9+3)
SOLUTION TO SYSTEM OF LINEAR EQUATIONS : Jacobi, Gauss Siedel iteration method - Solution of algebraic and transcendental equations - Bisection method, Regula-Falsi method & Newton Raphson's Method.

TEXT BOOK :

REFERENCE BOOKS :
1. S.S Sastry, “Introductory Numerical Analysis”.
EI226 BASIC ELECTRONICS

Course: II/IV B.Tech II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours

Theory: 3 Periods/week
Tutorial: 1 period/week
External Evaluation: 100
Internal Evaluation: 50

UNIT – I


UNIT – II

Transistor : PNP and NPN transistor, Symbols and diode equivalent of transistor, transistor current components, CE, CB,CC Characteristics, Comparison of three configurations, Construction, Principle of operation and characteristics of FET, MOSFETS and UJT.

UNIT – III

Comparison of BJT and FET.


UNIT – IV


SUGGESTED TEXT / REFERENCE BOOKS:

CS223 DATA STRUCTURES

Course: II/IV B.Tech. II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours
Theory: 3 Periods/week
Tutorial: 1 Period/week
External Evaluation: 100
Internal Evaluation: 50

UNIT-I                          (9+3)
Basics of Data Structures: Data structure definition, Applications of data structures, Algorithms, Programs, Design and analysis steps, Time and Storage analysis.
Arrays: Representation of arrays, Memory allocation for arrays, Operations on arrays, Applications of arrays, Pointer arrays, Sparse matrix Operations, Polynomial operations.
Stacks: Stack model and operations, Stack implementation, Multiple stacks.
Stack applications: Infix, Prefix, Postfix notations, Conversion and evaluation of expressions, Recursion.

UNIT-II                        (9+3)
Queues: Queue model and operations, Queue implementation, Circular queue, Circular queue implementation, Dequeues, Priority queues, Applications of queues.
Linked Lists: Definition, Representation of a linked list in memory, Operations on single linked list, Double linked list, Operations on double linked list, Circular Linked list, Linked list operations with header node, Implementation of stacks and queues using linked lists.
Applications of linked lists: Sparse matrix representation, Sparse matrix operations using lists, Polynomial representation, Polynomial operations, Dynamic storage Management, Generalized lists, Garbage collection and Memory compaction.

UNIT-III                       (9+3)
Trees: Basic terminologies, Binary trees representation using arrays, Binary tree representation using linked lists, Binary tree traversal algorithms: inorder traversal, preorder traversal, postorder traversal, Threaded binary tree, binary search tree, Binary search tree operations(addition of a node, deleting a node), AVL trees, B-trees and B+ trees.
Graphs: Terminology, Graph representation methods: adjacency matrix, adjacency lists, adjacency multilists, Graph traversal algorithms: Depth first search, Breadth first search, spanning trees, Minimum spanning tree, Shortest paths.

UNIT-IV                        (9+3)
Searching: Linear search algorithm, Binary search algorithm, Fibonacci search algorithm, Comparison of search algorithms.
Sorting: Insertion sort algorithm, Shell sort algorithm, Quick sort algorithm, Merge sort algorithm, Two way merge sort algorithm, Heap sort algorithm.
Tables: Rectangular tables, Tagged tables, inverted tables, Hash tables: Hash techniques, collision Resolution Techniques, closed hashing, open hashing, comparison of collision Resolution techniques.
(All above topics with intuitive notion of complexity of algorithms)

SUGGESTED TEXT / REFERENCE BOOKS:
CS224 COMPUTER ARCHITECTURE AND ORGANIZATION

Course: II/IV B.Tech II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours

UNIT-I (9+3)
Number Representation: Integer, Signed, Unsigned, 1’s Complement, 2’s Complement, r’s Complement, Addition and Subtraction of Signed Numbers, Overflow in Integer Arithmetic, Fixed and Floating Point Representation, IEEE 754 Representation, BCD, Gray code.
Instructions: Memory Location and Address: Byte addressability, Big endian & Little endian assignments, Word alignment, Accessing Numbers, Characters and Character strings. Addressing modes, Instruction Format: Three, Two, One, Zero Address Instructions, Risk Instructions, Modes of Instructions, Instruction Sequencing, Assembly Language, Stacks and Queues, Subroutines.

UNIT-II (9+3)
Central Processing Unit: Fundamental Concepts, Execution of Complete Instruction, Control Unit, Micro Programming Control Unit, Hardwired Control Unit, Study of 8088, Power Pc Processor.

UNIT-III (9+3)
Computer Arithmetic: Addition & Subtraction of Signed Numbers, Carry look ahead adder, Multiplication of positive numbers, Booth’s Algorithm, Fast Multiplication, Integer Division, Floating Point Arithmetic Operation: Addition, Subtraction, Multiplication & Division.

UNIT-IV (9+3)
Advanced Concepts: Pipelining: Basic concepts, Data & instruction hazards, Influence on instruction sets, Data path and control considerations, Super scalar operations. Introduction to RISC, CISC.
Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General purpose multiprocessor, Interconnection Networks, Memory Organization, Program Parallelism and Shared Variables.
SUGGESTED TEXT / REFERENCE BOOKS:

CS225 PRINCIPLES OF PROGRAMMING LANGUAGES

Course: II/IV B.Tech II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours

UNIT- I (9+3)

Preliminaries of Programming Languages: Software development process, Languages and software development environment, Languages and software design methods, Languages and computer architecture, Programming language qualities, A brief historical perspective, The bird’s-eye view of programming language concepts, A simple program Syntax and semantics, Expressions, Program organization, Program data and algorithms, Data, Computation, External environment.


UNIT- II (9+3)

Structuring the Data: Built-in types and Primitive types, Data aggregates and type constructors, Insecurities of pointers, User-defined types and abstract data types, Abstract data types in C++, Type systems, Static versus Dynamic program checking, Strong typing and type checking, Type compatibility, Type conversions, Types and subtypes, Generic types, Monomorphic versus Polymorphic type systems, The type structure of representative languages, Pascal, C++, Implementation models, Built-in primitive types and enumerations, Pointers and garbage collection.

UNIT- III (9+3)

Structuring the Computation: Expressions and statements, Conditional execution, Iteration, Routines, Style issues, Side effects and aliasing, Exceptions, Exceptions handling in C++, A comparative evaluation, Pattern matching, Nondeterminism and Backtracking, Event driven computations, Concurrent computations, Process, Synchronization and communication, Semaphores, Monitors and signals, Rendezvous.

Structuring the Program: Software design methods, Concepts in support of modularity, Language features for programming in large in C, C++, Abstract data types, classes and modules, Generic units, Generic data structures, Generic algorithms, Generic modules, Higher levels of genericity.

Object-Oriented Languages: Concepts of object-oriented programming, Inheritance and the type system, Object-oriented features in programming languages, Object-oriented features in Java.

UNIT- IV (9+3)

Functional Programming: Characteristics of imperative languages, Mathematical and programming functions, Principles of functional programming, Representative functional languages, LISP, APL, Functional programming in C++.

Logic and rule-based languages: Specification versus Implementation, Principles of logic programming, PROLOG, Functional programming versus Logic programming, Rule-based languages.
SUGGESTED TEXT / REFERENCE BOOKS:

EI227 BASIC ELECTRONICS LABORATORY

Course: II/IV B.Tech. II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours
Laboratory: 3 Hrs / week
External Evaluation: 100
Internal Evaluation: 50

LIST OF EXPERIMENTS

1. Characteristics of a Semiconductor diode / Zener diode
2. Half-wave / Full – wave Rectifier with and without filters
3. Voltage Regulator
4. FET Static Characteristics CS (Common Source)
5. Biasing Circuits (BJT) fixed bias, collector to base bias, self bias.
6. Transistor as Switch / Amplifier.
7. R.C. Phase-Shift Oscillator.
8. Op-amp inverting & Non inverting amplifier
11. 555 Timer as Astable Multivibrator.
12. 555 Timer as Monostable Multivibrator.
LIST OF EXPERIMENTS

1. Write programs for the following.
   a) reading a character and displaying it on screen.
   b) to display the name and class of student in separate line.
   c) to display the characters from ‘A’ to ‘Z’.
   d) to check the given two characters are equal or not.
   e) To display alphabets in circular form from given character to the character before
      the given character.
   f) To convert the given alphabet into opposite case.

2. Write programs for the following.
   a) Display the given character in its binary form.
   b) To check given number is even or odd.
   c) To check given number sign (+/-).
   d) To find 2’s complement of given number.
   e) To change given bit position on in given binary number.
   f) To change given bit position off in given binary number.
   g) Reading a string and displaying it in reverse order.

3. Write programs for the following.
   a) To display 0 to 9 number.
   b) To display decimal number on screen
   c) To convert given hexadecimal into decimal number.
   d) To clear the screen.
   e) To display a message in center of the screen.
   f) To find min and max elements in the given Array.

4. a) General Utility Commands: login, cal, date, who, uname, echo, passwd, pwd, exit.
   b) File & Directory Related Commands: ls, cd, mkdir, rmdir, cat, cp, rm, mv, wc, od, comm, diff, split, ln, touch, chmod, chown, chgrp

5. (a) Do the following problems.
   a) Display the contents of file (filenames starting with ‘a’ and ending with X)
   b) Copy the contents of directory1 to directory2.
   c) Remove the all .C files from current directory.
   d) Find out the no. of lines, words, chars in given file.
   e) Display the identical lines from two given files.
   f) Display the non identical lines from two given files.
   g) Merge the three different files into single one.
   h) Display the list of files in given directory.
   i) Set given file as read only.
   j) Set given file as read, write but not executable.
(b) Filters: (Data Processing Commands): more, head, tail, cut, paste, sort, uniq, nl, tr

6.
(a) Pattern Searching Commands: grep, egrep, fgrep
(b) Do the following
   a) Display the details of all users those who are working on system.
   b) Display the details of all users in a order they logged on to system(based one time)
      who are working on system.
   c) Create Employee(enum, ename, designation, Date of birth, Salary) Table (file)
      i. Find the details of employee from table whose name is given.
      ii. Display the last two records.
      iii. Display the details of employees in order based Date of Births.
      iv. Remove the duplicate records.
      v. Display the details of employees who are managers.
      vi. Find out the details persons whose name ends with letter ‘a’

7.
(a) Process Related Commands: ps, kill, nice, at & batch
(b) Communication Commands: write, mail, talk, finger, news
(c) Shell Script Related Commands: sh, read, command line args ($1), $ & & $*, set, exit
    status ($?), logical operator ||,&& ,exit ,if, sleep& wait, case, while & until, for, here
    documentation (<<start….start), trap, export variables, expr command

8. Write a Shell Scripts for the following.
   a) Display attributes of file in readable format.
   b) Remove duplicate files from the current directory
   c) Write a Script that displays, the last 3 lines of every file specified on the command
      line, preceded by the filename.
   d) Write a script to convert the given file into uppercase
   e) Accept two directory names as command lines arguments
      (a)Delete identical files from the both directories.
      (b)Identical files must be in any one of the directory.
   f) Write a shell script, which reports the names and sizes of files in a directory where
      file size exceeds one 1000 bytes. The directory is supplied as command line
      arguments. The file names should be printed in descending order of their file size.
      The total no. of such files should also be printed.
   g) The file /etc/passwd contains information about all the users of the system but it is
      difficult to read. Write a shell script /etc/passwd and displays in readable format.
   h) Display the list of files in current directory.
      a. In-order of modification time.
      b. In-order of access time.

9.
   a) Display the list of files in the current directory to which you have read, write and
      execute permissions. Display the list of directories to which you have execute
      permissions.
   b) Write a shell script, for multiple file copying. Ex. mcp s1 d1 s2 d2 s3 d3 ……
   c) Write a shell script, which executes at login time. The script should display the
      present working directory, calendar of the present month and report to you whether
      your friend has logged in. If yes, send a message to his terminal inviting him for a
dinner. If you don’t have write permission to his terminal, mail him with request for his confirmation.

d) Write a shell script which gets executed at login time and displays a blinking message “Good morning/Good Afternoon / Good Evening “ depending upon the time at which the user logs in.

e) Write a shell script that accepts login name as command line argument, and finds out at how many terminals the user has logged in. Do not use grep command

10.

a) Write a shell script, which develops functions for factorial and power

b) Find out recursively the files in current directory which have been last modified on January 7th of current year.

c) Develop a command ‘misc’ which accepts an option and a file name as arguments to perform the following tasks.
   - If the option is –u then convert all the characters in the file to upper case.
   - If the option –l then convert all the characters in the file to lower case.
   - If the option is –d, change the delimiter to a character of your choice.
   - If the option supplied is not one of the choices, or file name is missing then appropriate error message with the usage of the command should be displayed.

11.

a) Rename each file in the present directory such that it will have the current shell PID an extension. Do not rename directories. Delete all the files whose size is 0 bytes.

b) Display the information(attributes) of processes running on system in readable format

c) Display the list of files for every 5 minutes.

d) Display the process details in the system every 30 seconds but five times

12. System Calls

   File oriented System calls : open( ), creat( ) , close( ) , read( ) , write( ) , lseek( )

   Process system calls:  fork( ) , exit( ), exec( ) , wait( ) , kill( )
CS229 DATA STRUCTURES LABORATORY

Course: II/IV B.Tech II Semester
Branch: Common to CSE, IT
External Examination: 3 Hours
Internal Examination: 2 Hours

Laboratory: 3 Periods/week
External Evaluation: 50
Internal Evaluation: 25

LIST OF EXPERIMENTS
1. Implementation of sparse matrix representation.
2. Implementation of sparse matrix operations (transpose and addition)
5. Implementation of circular queue using arrays.
6. Conversion of infix to postfix.
7. Conversion of infix to prefix.
8. Implementation of postfix evaluation.
10. Implementation of dequeues using arrays.
11. Implementation of single linked list and double linked list operations.
   a) Addition
   b) Deletion
   c) Reverse
   d) sorting
   e) concatenation
   f) copying
12. Implementation of stack operations using linked lists.
13. Implementation of queue operations using linked lists.
15. Implementation of single linked list operations using header node.
16. Implementation of double linked list operations using header node.
17. Implementation of polynomial operations.
   a) Addition
   b) Multiplication
   a) Inorder
   b) Preorder
   c) Postorder
20. Implementation of binary search tree operations.
   a) Insertion of a node
   b) Deleting a node
21. Implementation of counting no. of nodes, no. of leaf nodes and height of a binary tree.
22. Implementation of graph representation algorithms.
23. Implementation of graph traversal algorithms.
   a) Depth first search
   b) Breadth first search
   a) Linear search
   b) Binary search
   c) Fibonacci search.
   a) Insertion sort
   b) Shell sort
   c) Quick sort
   d) Merge sort
   e) Heap sort

   a) Open hashing.
   b) Closed hashing.