COURSE STRUCTURE
REGULATIONS: SVEC-10

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech I Semester

<table>
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II B.Tech II Semester

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II B.Tech. I Semester

10BT3BS01: PROBABILITY AND STATISTICS

UNIT - I: PROBABILITY & MATHEMATICAL EXPECTATIONS
Introduction to probability: Definition of Random Experiment, Events and Sample space, Definition of probability, Addition and Multiplication theorems, Conditional probability, Baye's Theorem, Simple Problems on Baye's theorem.
Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT - II: PROBABILITY DISTRIBUTIONS
Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution, Applications.

UNIT-III: CORRELATION AND REGRESSION
Correlation: Definition, Measures of correlation, Correlation for Bivariate Distribution, Rank correlation coefficients.
Regression: Simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS
Population and Sample, Parameter and Statistic, Sampling Distribution of Statistic, Standard Error of Statistic, Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom.
UNIT-V: LARGE SAMPLES TEST OF SIGNIFICANCE
Test of Significance for Single Proportion, Test of Significance for Difference of Proportions, Test of Significance for a Single Mean, Test of Significance for Difference of Means and Test of Significance for Difference of standard deviations.

UNIT - VI: SMALL SAMPLES TEST OF SIGNIFICANCE
Student's t-test, F-test for equality of population variance, Chi-square Test for Goodness of Test, contingency table, Chi-square Test for Independence of Attributes.

UNIT - VII: Statistical Quality Control
Introduction, Advantages and limitations of statistical quality control, Control charts, Specification limits, $\bar{X}$, R, np and c charts.

UNIT - VIII: QUEUING THEORY:
Queuing Theory, Pure Birth and Death Process, M/M/1 Model, Problems.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. I Semester
10BT30421: ELECTRONIC DEVICES AND CIRCUITS

UNIT-I: PN JUNCTION DIODE

UNIT-II: RECTIFIERS AND FILTERS
PN Junction as a Rectifier, Halfwave rectifier, ripple factor, fullwave rectifier, Bridge Rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, pi-section filter, Use of Zener Diode as a Regulator.

UNIT-III: BIPOLAR JUNCTION TRANSISTOR (BJT)
Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Transistor currents and their relations, Input & Output Characteristics of a Transistor in CB, CE and CC Configurations, BJT specifications.

UNIT-IV: TRANSISTOR BIASING AND STABILIZATION
Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization against Variations in VBE and b.

UNIT-V: BJT AMPLIFIERS
BJT Hybrid Modeling for CB, CE and CC Configurations, Determination of h-Parameters from Transistor Characteristics, Comparison of CB, CE and CC configurations, Simplified Hybrid Model.

UNIT-VI: FIELD EFFECT TRANSISTOR
Field Effect Transistor Amplifiers: Common Source, and Common Drain Amplifiers using FET, Generalized FET Amplifier, Biasing of FET, Comparison between BJT and FET.

UNIT-VII: FEEDBACK AMPLIFIERS AND OSCILLATORS
(Qualitative treatment)

UNIT-VIII: SPECIAL PURPOSE ELECTRONIC DEVICES
Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR) and applications.

TEXT BOOKS:

REFERENCE BOOKS:
3. Rober T. Paynter, Introduction to Electronic Devices and Circuits, 6 ed, Pearson Education.
II B.Tech. I Semester

10BT30421: BASIC ELECTRICAL ENGINEERING

UNIT–I: INTRODUCTION TO ELECTRICAL ENGINEERING

UNIT–II: NETWORK ANALYSIS

UNIT–III: ALTERNATING QUANTITIES
Principle of AC voltages - wave forms and basic definitions - RMS and average values of alternating currents and voltage - form factor and Peak factor - phasor representation of alternating quantities - the J operator and phasor algebra - analysis of AC circuits with single basic network element - single phase series and parallel RLC circuits - power factor.

UNIT–IV: THREE PHASE CIRCUITS

UNIT–V: DIRECT CURRENT MACHINES
Constructional details of a DC machine - principle of operation of a DC generator - types of DC generators - emf equation of a generator– Applications. DC motors - Principle of operation - types of DC motors - Torque equation - losses and efficiency-Applications.
UNIT-VI: ALTERNATING CURRENT MACHINES
Transformers - principle of operation - constructional details - losses and efficiency - regulation of transformer - testing of Transformers: OC and SC test- Simple problems.
Three phase Induction motors: Constructional details- principle of operation – slip - rotor frequency.

UNIT-VII: SPECIAL MACHINES

UNIT-VIII: BASIC MEASURING INSTRUMENTS
Introduction - classification of instruments - operating principles - essential features of measuring instruments - permanent magnet moving coil (PMMC) and moving iron instruments (voltmeters and ammeters)- Digital multimeters.

TEXT BOOKS:

REFERENCE BOOKS:
2. V.K. Mehta, Rohit Mehta, principles of electrical engineering, S. Chand & Company Ltd., 2006
UNIT-I: BINARY SYSTEMS
Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

UNIT-II: BOOLEAN ALGEBRA AND LOGIC GATES
Basic Definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, Other logic operations, Digital logic gates, Integrated circuits.

UNIT-III: GATE – LEVEL MINIMIZATION
The k-map method - Four-variable map, Five-Variable map, product of sums simplification Don’t-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function, Hardware Description language (HDL).

UNIT-IV: COMBINATIONAL LOGIC
Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT-V: SYNCHRONOUS SEQUENTIAL LOGIC
Sequential circuits, Latches, Flip-Flops, Analysis of clocked sequential circuits, HDL for sequential circuits, State Reduction and Assignment, Design Procedure.

UNIT-VI: REGISTERS AND COUNTERS
Registers, shift Registers, Ripple counters, Synchronous counters, Other counters, HDL for Registers and counters.
UNIT-VII: MEMORY AND PROGRAMMABLE LOGIC
Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

UNIT-VIII: ASYNCHRONOUS SEQUENTIAL LOGIC

TEXT BOOKS:

REFERENCE BOOKS:
UNIT-I: MATHEMATICAL LOGIC
Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

UNIT-II: PREDICATES

UNIT-III: RELATIONS AND FUNCTIONS
Relations: Properties of binary relations, Equivalence relations, Compatibility relations Partial ordering relations, Hasse diagram and related applications.
Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-IV: ALGEBRAIC STRUCTURES
Algebraic System Examples and General Properties, Semi Groups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-V: MATHEMATICAL REASONING
Methods of Proof, Mathematical Induction.

UNIT-VI: RECURRENCE RELATIONS
Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.
UNIT-VII: GRAPHS
Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler’s Formula and Graph Coloring, 4-color theorem, 5-color theorem.

UNIT-VIII: GRAPH THEORY AND ITS APPLICATIONS
Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal’s Algorithm and Prim’s Algorithm.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. I Semester

10BT30502: DATA STRUCTURES

UNIT-I: INTRODUCTION TO DATA STRUCTURES
Definition, Classification, The Abstract Data Type (ADT), model for ADT, ADT implementation, Generic code for ADTs
Sorting: Sort concepts, Merge sort, Shell sort, Quick sort, Heap sort.
Searching: Sequential search, variations on sequential search, Binary search, Fibonacci search.

UNIT-II: GENERAL LINEAR LISTS
Singly linked list, Basic Operations, Implementation, List ADT, Circularly linked lists, Doubly linked lists, Multi linked lists.

UNIT-III: STACKS AND QUEUES
Basic stack operations, Stack linked list, implementation, Stack ADT, Applications: Reversing data, Convert Decimal to binary, Postponement.
Queues: Queue operations, Queue linked list design, Queue ADT, Applications: Categorizing data, Queue simulations.

UNIT-IV: NON LINEAR LISTS
Basic tree concepts, Binary trees: properties, traversals, expression trees.
Binary search trees: Basic concepts, Operations, Binary Search Tree ADT, Threaded trees.

UNIT- V: AVL TREES
Basic Concepts, Balance Factor, implementation, ADT, Algorithms, And Applications: Count words.
Heaps: Basic Concepts, Implementation, ADT, Heap Application.

UNIT- VI: MULTIWAY TREES
UNIT-VII: GRAPHS
Basic Operation, Review of traversals- Breadth first traversal, Depth first traversal, Graph storage structures, Graph ADT, Networks: Minimum spanning trees, Shortest path algorithm.

UNIT-VIII: HASH TABLES
Introduction, Hash Table structure, Hash functions, Linear open Addressing, Chaining, Applications.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. I Semester

10BT30431: ANALOG AND DIGITAL ELECTRONICS LAB

L T P C
- - 3 2

PART A: ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)
1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B: Analog Devices and Circuits (Minimum seven experiments to be conducted)
1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Fullwave or Halfwave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C: Digital Circuits
Realization of:
1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of:
VHDL Programme
1. a. Implement Quick sort algorithm on the list L={ 67, 78, 34, 11, 99, 42, 56, 23} and display the output list at the end of each pass.
   b. Implement Merge sort algorithm on the lists L1={123, 678, 345, 225, 890, 650, 111}, L2= { 654, 789, 912, 144, 255, 666 }.

   b. Implement Heap sort for the list L of 1 (a).

3. Implement binary search and Fibonacci search algorithms on an ordered list L={2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18, 19,20} Undertake search for the elements in the list { 3, 18, 1, 25}. Compare the number of keys comparisons made during the searches.

4. Write a program to implement the following operations on singly linked list.
   i) Creation  ii) Insertion  iii) Deletion  vi) Display

5. Write a menu driven program which will maintain a list of car models, their price, name of the manufacturer, engine capacity etc., as a doubly linked list. The menu should make provisions for inserting information pertaining to new car models, delete obsolete models, update data such as price besides answering queries such as listing all car models with in a price range specified by the client and listing all details given a car model.

6. Write C programs to implement the following using an array.
   i) Stack ADT  ii) Queue ADT
7. Write C programs to implement the following using a singly linked list.
   i) Stack ADT ii) Queue ADT

8. Write a C program to perform the following operations:
   i) Insert an element into a binary search tree.
   ii) Delete an element from a binary search tree.
   iii) Search for a key element in a binary search tree.

9. Write C program that use recursive functions to traverse the given binary tree in
   i) Preorder ii) Inorder iii) Postorder (Non recursive)

10. Write a C program to perform the following operation
    i) Insertion into an AVL – tree
    ii) Deletion from an AVL – tree

11. Write a C program to perform the following operations
    i) Insertion into a B-tree
    ii) Deletion from a B-tree

12. Write C programs for the implementation of BFS(Breadth First Search) and DFS(depth First Search) for a given adjacency matrix.

   **Adjacency Matrix for a Simple Graph:**

   From the chart above, the adjacency matrix for the graph G is:

   
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SVEC10 - Computer Science and Engineering 65
13. a. Implement a hash table using an array data structure. Design functions to handle overflows using i) linear probing ii) quadratic probing iii) rehashing for a set of keys.

b. Implement a hash table for a given set of keys using chaining method of handling overflows. Maintain the chains in the ascending order of keys. Design a menu driven front end to perform the insert, delete, and search operations on the hash table.

**TEXT BOOKS:**

**REFERENCE BOOKS:**
UNIT - I: INTRODUCTION TO ENVIRONMENTAL SCIENCES
Definition and concept of the term environment – Various components of environment – Abiotic and biotic – Atmosphere – Hydrosphere – Lithosphere – Biosphere – Inter relationships – Need for public awareness – Role of important national and international individuals and organizations in promoting environmentalism.

UNIT - II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT
Renewable and Non renewable resources and associated problems– Forests: Deforestation, Causes, effects and remedies – Effects of mining, dams and river valley projects – case studies; Water resources: Water use and over exploitation – Conflicts over water – Large dams – benefits and problems; Food resources: World food problems – Adverse effects of modern agriculture – Fertilizer and pesticide problems; Land resources: Land degradation– Land slides- Soil erosion – desertification- water logging – salinity – Causes, effects and remedies; Mineral resources: Mining – Adverse effects; Energy resources: Growing needs – Renewable and Non renewable resources – Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT - III: ECOLOGY AND ECOSYSTEMS
UNIT - IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT

UNIT - V: ENVIRONMENTAL POLLUTION AND CONTROL

UNIT - VI: SOCIAL ISSUES AND THE ENVIRONMENT

UNIT - VII
HUMAN POPULATION AND ENVIRONMENT
UNIT - VIII
FIELD WORK/ENVIRONMENTALIST’S DIARY/ASSIGNMENTS/SEMINARS

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. II Semester

10BT4HS01: **MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY**

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**UNIT-I : INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS**


**UNIT-II : THEORY OF PRODUCTION AND COST ANALYSIS.**

Production Function: isoquants and isocosts. Input – output relationship. Law of returns, internal and external economies of scale. cost concepts: opportunity Vs outlay costs, Fixed Vs Variable costs, Explicit Vs implicit costs, out of pocket Vs inputted costs. Break Even Analysis (BEA), Determination of break even point (Simple problems).

**UNIT-III : INTRODUCTION TO MARKETS AND PRICING.**


**UNIT-IV : BUSINESS AND NEW ECONOMIC ENVIRONMENT.**

UNIT-V : INTRODUCTION AND PRINCIPLES OF ACCOUNTING

UNIT – VI : FINAL ACCOUNTS
Introduction to Final Accounts. Trading Account, Profit and Loss Account, and Balance Sheet with simple adjustments (Simple Problems).

UNIT – VII : CAPITAL AND CAPITAL BUDGETING

UNIT – VIII : COMPUTERIZATION OF ACCOUNTANCY SYSTEM

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I: STRUCTURE OF COMPUTERS
Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.

UNIT II: REGISTER TRANSFER AND MICRO-OPERATIONS
Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). Comparison of RISC and CISC.

UNIT III: MICRO-PROGRAMMED CONTROL
Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT IV: PIPELINE AND VECTOR PROCESSING
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.
UNIT V: THE MEMORY SYSTEM
Basic Concepts, Semiconductor RAM, Types of Read-only Memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).

UNIT-VI: INPUT-OUTPUT ORGANIZATION (ADVANCED)
Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols Like RS232, USB, and IEEE1394.

UNIT VII: MULTIPROCESSORS

UNIT VIII: CASE STUDIES
CISC Architecture-Pentium IV, RISC Architecture-PowerPC.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. II Semester

10BT40502: OBJECT ORIENTED PROGRAMMING

UNIT-I: OBJECT ORIENTED THINKING
Need for OOP paradigm, OOP concepts, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and de-allocation.

UNIT-II: POLYMORPHISM AND INHERITANCE
Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes, Streams.

UNIT-III: BASICS OF JAVA
History of Java, Java buzzwords, 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-IV: INHERITANCE AND INTERFACES
Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.
Interfaces: differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V: PACKAGES AND EXCEPTION HANDLING
Exception handling: Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-VI: MULTITHREADING
Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads.
Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

UNIT-VII: 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, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – boarder, grid, flow, card and grid bag.

UNIT-VIII: SWINGS
TEXT BOOKS:
2. Herbert Schildt, *Java; The complete reference*, 7 ed, TMH.

REFERENCE BOOKS:
UNIT-I: PRELIMINARY CONCEPTS

UNIT-II: DATA TYPES
Introduction, primitive, character, String, user-defined, array, associative arrays, records, set, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

UNIT-III: EXPRESSIONS AND STATEMENTS
Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures: Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

UNIT-IV: SUBPROGRAMS AND BLOCKS
Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co-routines.
UNIT-V: ABSTRACT DATA TYPES
Abstractions and encapsulation, introductions to data abstraction, design issues, Concept of Object, Inheritance, Derived classes, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95, Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

UNIT-VI: EXCEPTION HANDLING
Exceptions, exception Propagation, Exception handler in Ada, C++ and Java. Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

UNIT-VII: FUNCTIONAL PROGRAMMING LANGUAGES
Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages, Database Query Languages(using SQL as Example).

UNIT-VIII: SCRIPTING LANGUAGES
Case Study : Python, PERL, PHP, ABAP – Key concepts, Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

TEXT BOOKS:

REFERENCE BOOKS:
1. A.B. Tucker, R.E. Noonan, Programming Languages, 2 ed, TMH.
UNIT I: INTRODUCTION
Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and work stations and input devices, graphics standards.

UNIT II : OUTPUT PRIMITIVES
Points and lines, line drawing algorithms, midpoint circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT III : 2-D GEOMETRICAL TRANSFORMS
Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT IV : 2-D VIEWING
The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland–Hodgeman polygon clipping algorithm.

UNIT V : 3-D GEOMETRIC TRANSFORMATIONS
Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.
3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.
UNIT VI: MULTIMEDIA SYSTEMS DESIGN

UNIT VII: MULTIMEDIA FILE HANDLING

UNIT VIII: HYPERMEDIA

TEXT BOOKS:

REFERENCE BOOKS:
1. a) Write a C++ program that prints Student Name, Roll No., Branch, Marks and display the Total and Division in the following format after reading the necessary input (Use\n \t etc..).

   Name :: ********
   Roll No :: ********
   Branch :: ********
   Marks :: ********
   Total :: ********
   Division :: ********

b) Write a C++ program to perform complex operations addition, Subtraction, Multiplication and Division using friend function.

2. a) Write a program in C++ to perform the following using the function template concepts.
   a. To read a set of integers
   b. To read a set of floating point numbers
   c. To read a set of double numbers
   Write function for finding average of non-negative numbers and also calculate the deviation of the numbers.

b) Write a class Fraction that defines methods addition, subtraction, multiplication and division of fractions by overloading basic arithmetic operators.

3. a) Write a C++ program to implement the given hierarchy, using the appropriate methods.
Salary – DA, HRA, PF, Dailywages – 200/- per day, Consolidated pay – Fixed Amount

b) Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data() to initialize base class data members and another member function display area() to compute and display the area of figures. Make display area() as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively, and display the area.
Remember the two values given as input will be treated as length of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows:

\[
\text{Area of rectangle} = x \times y \\
\text{Area of triangle} = \frac{1}{2} \times x \times y
\]

4. a) Create a class called Date that includes three pieces of information as instance variables-a month (type int), a day (type int). Your class should have a constructor that initializes the three values provided are correct. Provide set and get method for each instance variable. Provide a method display date that displays the month, day, year separated by forward slashes (/). Write a test application named DateTest that demonstrates Class Date’s capabilities.

b) Create a class huge Integer which uses a 40-element array of digits to store integers as large as 40 digits each. Provide Methods: isEqualTo, isNotEqualTo, isGreaterThan, isLessThan, isGreaterThanorEqual and isLessThanorEqualTo. Each method returns a boolean value if the relation ship holds true.

5. a) Write a program that reads a line of integers (maximum limit 6 digits), and then displays each integers and sum of all the integers. (Hint: Use StringTokenizer class)

b) Write a program to do the following
   a) To print a question “Who is inventor of Java”?
   b) To accept the answer
   c) To print out “Good” and then stop, if the answer is correct.
   d) To output the message “try again”, if the answer is wrong.
   e) To display the correct answer when the answer is wrong even at the third attempt and stop.

6. a) Assume that a bank maintains two kinds of account for its customers, one called saving account and the other current account.
The savings account provides compound interest and with drawl facilities but no chequebook facility. The current account provides chequebook facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes Curr_Acct and Sav_Acct to make them more specific to their requirements.

Include the necessary methods in order to achieve the following tasks:

a) Accept deposit from a customer and update the balance
b) Display the balance.
c) Compute and deposit interest.
d) Permit with drawl and update the balance.
e) Check for the minimum balance, impose penalty, if necessary and update the balance.

b) Write an inheritance hierarchy for classes Quadrilateral, Trapezoid, Parallelogram, Rectangle and Square. Use Quadrilateral as the super class of the hierarchy. Make the hierarchy as deep as possible. Specify the instance variables and methods for each class. The private instance variables of Quadrilateral. Write a program that instantiates objects of your classes and outputs the object’s area (except Quadrilateral).

7. a) Write a program to illustrate an inner class by creating an anonymous object in the main class.

b) Design an interface ‘Movable Shape’ that can be used as a generic mechanism for animating a shape. A movable shape must have two methods: move and draw. Write a ‘Animation Panel’ class that paints and moves any ‘Movable Shape’ supply movable rectangle and car shapes.

8. a) Write a package called Math that implements class exactly java.lang.math, with a distinguished set of mathematical functions and also Date manipulation functions.

b) Implement Stack ADT using Packages.
9. a) Write a program that converts from 24-hour time to 12-hour time. Define an exception class IllegalTimeFormat, if the user enters an illegal time like 11:65 or even gibberish like &* 68, throw and catch the exception.

b) Write a program that calls a method that throws an exception of type Arithmetic Exception at a random iteration in a for loop. Catch the Exception in the method and pass the iteration count when the exception occurred to the calling method by using an object of an exception class you define. Add a finally block to the method to output the iteration count when the method exists.

10. a) Write a program that correctly implements producer consumer problem using the concept of inter thread communication.

b) Write a program that demonstrates time slicing among equal priority threads, show that a lower priority thread’s execution is deferred by the time slicing of higher-priority threads.

11. a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.

12. a) Write a Java program for handling Mouse Events.

b) Write a Java program for handling Keyboard Events.

13. Write a Java program 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.
Line and Circle Drawing Algorithms:
1. Write a program to implement DDA line drawing algorithm.
2. Write a program to implement Bresenham’s line drawing algorithm.
3. Write a program to implement Bresenham’s circle drawing algorithm.
4. Write a program to draw an ellipse using Bresenham’s algorithm.
5. Write a program to perform various transformations on line, square & rectangle.

2-D Clipping Algorithms:
6. Write a program to implement Cohen Sutherland line clipping algorithm.
7. Write a program to implement Liang-Bersky line clipping algorithm.
8. Write a program to implement Cohen-Sutherland polygon clipping algorithm to clip a polygon with a Pattern.

3-D Algorithms:
9. Write a program to implement 3D Geometrical transformations.
10. Write a program to implement 3D shear transformations.

Multimedia:
11. Write a program to convert a color given in RGB space to it’s equivalent CMY color space.
12. Study of various Multimedia file formats:-RTF, MIDI, GIF, JPEG, MPEG, TIFF etc.
13. Write a program to implement JPEG compression scheme for still images.
14. Write a program to perform Pack-bits compression & decompression.
15. Write a short program to create a TIFF file using bitmap segments and text files as the TIFF File components.
16. Write a program to convert a BMP file into either JPEG or GIF file.

TEXT BOOKS:

REFERENCE BOOKS:
List of Problems:

1. (a) Write a C program that accepts two integer arguments by a reference and perform a swap.
   (b) Write a C program to perform the following operations on N X N matrices.
       (i) Addition
       (ii) Subtraction
       (iii) Multiplication
       (iv) Transpose

2. (a) Write a function that accepts two arguments an array and its size. It performs a Bubble sort on the array elements. Use the indirection operator ‘*’ instead of the array subscript operator ‘[ ]’.
   (b) Write a function that accepts a string a character as arguments and returns the number of occurrences of the character in the string.

3. (a) Write a function that accepts a string as arguments and return 1 if it is a Palindrome and 0 it is not.
   (b) Write a C program which copies one text file to another.
   (c) Write a C program to reverse the first N characters of a given text file.

4. Write C program to process student records by using Structures with pointers. The student record consist of name, roll number, age, department, percentage.

5. Write a C++ program that prints the factorial of a given number using a constructor and a destructor member function.

6. Write an object oriented program in C++ to read a number n and print it digit by digit in words using inline member function.

7. Develop an object oriented program in C++ to prepare the mark sheet of an university examination with the following items read from the keyboard.
Name of the student, roll number, subject name, subject code, internal marks, external marks.

Design a base class consisting of the data members such as name of the student, roll number, subject name. The derived class consists of the data members, subject code, internal marks, external marks.

8. Write a program in C++ to perform the following using operator overloading:
   i) area of a circle
   ii) area of rectangle
   iii) area of a triangle

9. Develop a program in C++ to create a library information system containing the following for all the books in the library. Accession number, name of the author, title of the book, year of publication, publisher’s name, cost of the book.
   Design a base class with the data members Accession number, name of the author, title of the book. Another base class consists of year of publication, publisher’s name. The derived class consists of data member cost of the book. Construct a virtual base class for the Accession number.

10. Write a program in C++ to perform the following using the function template concepts.
    i) to read a set of integers
    ii) to read a set of floating point numbers
    iii) to read a set of double numbers individually.
    Find out the average of the nonnegative integers.

11. Write a program in C++ using a class template to read any five parameterized data type such as float and integer and print the average.

12. Write a program to convert a lower case character to an upper case character of a text file.

TEXT BOOKS: