Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Assessment Test 1	05
Internal Assessment Test 2	05
Assignment	10
Total	20
Formative Assessment as per guidelines	

Semester –II

Subject Title (Theory): Data Structures using C

Total Hrs.: 60.

Course Outcome (CO): After completion of course (Theory), students will be able to:

- **CO 1 :**To impart the basic concepts of data structures and algorithms.
- **CO 2 :** To familiar with data structural algorithms such as sorting & searching, stack & queue, linked list and trees.
- **CO 3 :** To be familiar with some graph algorithms such as binary tree representation of tree and operations on trees.
- **CO 4 :** To understand the basic concepts of tree traversal.
- **CO 5** : How to use basic data structure for program implementation.

Total Hrs.: 60

Unit I: 15 hrs.

Introduction to Data Structure: Structure Definition, Initialization, Array as structure, Array within structure, Union. Understanding pointers, Declaring and initializing pointers, accessing a variable through its pointer, static and dynamic memory allocation.

Definition of Data Structure, Classification of Data Structure: Primitive and Non-Primitive, Operations on Data Structure, Review of Array.

Unit II: 15 hrs.

Searching and Sorting: Searching Definition, Searching Techniques: Sequential search, Binary search. Comparison Between sequential and binary searching. Sorting Definition, Sorting Techniques: Bubble sort, Merge sort, Selection sort, Quick sort, Insertion Sort.

Unit III: 15 hrs.

Stack and Queue: Definition of stack, Array Representation of Stack, Linked List Representation of stack, Operation Performed on Stack, Infix, Prefix, Postfix notations, Conversion of arithmetic expressions, Application of stack. Definition of Queue, Array Representation of Queue, Types of Queues: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on all types of queues.

Unit IV: 15 hrs.

Linked List: Definition, Representation of linked lists in Memory, Types of linked list: Singly linked list,Doubly linked list and Circular linked list. Operations on linked list: Creation, Insertion, Deletion, Search, Display and Traversing. Advantages and disadvantages of linked list.

Trees: Definitions, Tree terminology, Binary tree, Complete binary tree. Operations on Binary Trees, Representation of binary tree.

Text Books

1. Kamthane: Introduction to Data Structure in C. Pearson education 2005.
2. Fundamentals of Data structures in C, 2nd Edition, Horowitz, S. Sahni and Susan Anderson-Freed, Universities Press.

References

1. Data Structures using C, A.M. Tanenbaum, Y. Langsam, M.J. Augenstein, Pearson.
2. Data structures and Program Design in C, 2nd edition, R. Kruse, C.L. Tondo and B. Leung, Pearson.
3. Data structures A Programming Approach with C, D.S. Kushwaha and A.K. Misra, PHI.
4. E. Balaguruswamy, Programming in ANSI C, Tata Mc Graw-Hill.

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Assessment Test 1	05
Internal Assessment Test 2	05
Assignment	10
Total	20
Formative Assessment as per guidelines	

Subject Title (Practical): Data Structures Lab (using C)

Course Outcome (CO): After completion of course (Practical), students will be able to:

CO 1 : Be able to design & implement list data structure using
- i. Stack & Queue
- ii. Linked list
- iii. Singly & doubly linked list

CO 2 : Design & implement searching and sorting by applying various operations.

CO 3 : Design & implement basic operation on trees.

List of the Experiments for 52 hrs / Semesters

1. Write a Program to create, Initialize and access a pointer variable.
2. Write a Program to Calculate the length of the string using a pointer.
3. Write a Program to swap numbers using pointer.
4. Write a program in C to print all permutations of a given string using pointers.
5. Write a Program to store n students information using structure.
6. Write Program to implement Push, Pop and Traverse operation on STACK.
7. Write Program to convert infix notation to postfix notation.
8. Write Program to convert Infix notation to prefix notation.
9. Write a program to convert Prefix notation to postfix notation.
10. Write Program to perform the operation Insert, Delete and Display on Queue.
11. Write Program to implement Circular queue.
12. Write Program to implement Double ended queue.
13. Write Program to implement Priority queue.
14. Write a Program to search an element using Linear search.
15. Write a Program to sort given Array using Insertion sort technique.
16. Write a Program to sort given Array using Bubble sort technique.
17. Write a Program to sort given Array using Quick sort technique.
18. Write a Program to sort given Array using selection sort technique.
19. Write Program to implement Singly Linked List.
20. Write Program to implement Double Linked List.

Course No.2 (Theory): Object Oriented Programming using JAVA

Total Hrs.: 60

Course Outcomes (COs):

At the end of the course,(Theory) students will be able to:

CO 1: Explain the object-oriented concepts using JAVA.
CO 2: Write JAVA programs using OOP concepts like Abstraction, Encapsulation,
CO 3: Inheritance and Polymorphism.
CO 4: Implement Classes and multithreading using JAVA.
CO 5: Demonstrate the basic principles of creating Java applications with GUI.

DSC2: Object Oriented Programming using JAVA

Unit I	**Introduction to Java:** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. **Objects and Classes:** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.	15 hrs.
Unit II	**Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	15 hrs.
Unit III	**Event and GUI programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Exceptional handling mechanism.	15 hrs.
Unit IV	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming	15 hrs.

References:

1. Programming with Java, By E Balagurusamy – A Primer, 4th Edition, McGraw Hill Publication.
2. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall.
3. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1st Edition, PHI Learning 2017.
4. Java 2 - The Complete Reference, Herbert Schildt, 5th Edition, McGraw Hill Publication, 2017.
5. Java - The Complete Reference, Herbert Schildt, 7th Edition, McGraw Hill Publication, 2017.

OOP Lab(using JAVA)

Course Outcomes (COs):

Operators, Decision making and Loops:

1. Write a Java program to read the radius of a circle and to find the area and circumference.
2. Write a program to demonstrate String Operators
3. Write a Java program to find N prime numbers reading N as command line argument.
4. Write a program to find factorial of N numbers reading N as command line argument.
5. Write a program to read N numbers and sort them using one-dimensional arrays.

Classes and Methods:

6. Write a Java program to illustrate Method Overloading.
7. Write a Java program to illustrate Operator Overloading.
8. Write a program to demonstrate Single Inheritance.
9. Write a program to illustrate Constructor Overloading
10. Write a program to illustrate Method Overriding

Packages, Threads and Exception Handling:

11. Write a Java program demonstrating Multithreading.
12. Write a Java program demonstrating Exception Handling.
13. Write a Java program to demonstrate user defined package program.

Java Applet Programming

14. Write an Applet program to display Geometrical Figures using objects.
15. Write an Applet program which illustrate Scroll bar object.
16. Write an Applet program to change the background color randomly.
17. Write an Applet program to change the color of applet using combo box.
18. Write an Applet program to implement Digital Clock using thread.

Event Handling:

19. Write an Applet program to implement Mouse events.
20. Write an Applet program to implement Keyboard events.

COMPUTER ORGANIZATIONS AND ARCHITECTURE

Total Hrs.: 60

Unit-I **10 Hrs**

Number Systems: binary, octal hexadecimal, number base conversion, addition, subtraction of binary numbers, one's and two's complements, positive and negative numbers, character codes ASCH, EBCDIC.

Boolean algebra and Logic gates: Axiomatic definition of Boolean algebra, Basic theorems and properties, Boolean functions, canonical and standard forms, logic functions using gates and design of combinational circuits.

Unit-II **10 Hrs**

Simplification of Boolean functions: Karnaugh maps, product of sums, sum of products, simplification, NAND and NOR implementation, don't care condition.

Combinational and Sequential logic: Adders, subtractors, code, converters, decoder multiplexer, flip-flops, shift registers, counters.

Unit-III **10 Hrs**

Processor Logic Design: Processor organization, arithmetic logic unit, design of arithmetic and logic circuits, design of arithmetic logic unit, status registers, design of shifter, processor unit, design of accumulator.

Control Logic Design: Processor Organization, Hardware control micro program control, control of processor unit, PLA control, micro program sequencer, computer design.

Unit- IV **15Hrs**

Micro – computer System Design: Microcomputer organization, microprocessor organization, instructions and addressing modes, subroutines and interrupts, memory organization, input-output interface, programmed input-output, input – output processor, input – output device characteristics, direct memory access (DMA).

15Hrs

Memory Organization: Serial access, random access memories (RAM), read only memories (ROM), virtual memory, cache memory.

Introduction to 8085Assembly Language Programming: The 8085 Programming model, Instruction classification, Instruction format, How to write, Assemble and Execute a simple program, Overview of the 8085 Instruction set.

References:

1. Digital Logic and Computer Design, Morris Mano, PHI
2. Digital Computer Fundamentals, Bartee, T.C., MC Graw Hill
3. Computer Architecture and Organization, Tanenbaum A.S., Mc Graw Hill
4. Computer Architecture and Organization, hayes, J.P., Mc Graw Hill
5. Introduction to Microprocessors, Gaonkar, Tata Mc Graw Hill
6. Digital Computer Electronics Malvino& Brown Shird Education, TMH.