C. U. Shah University, Wadhwan City

Faculty of Computer Science

Name of Program: Bachelor of Science (Information Technology) (B.Sc.IT)

Semester : II

W.e.f. June – 2016

Teaching & Evaluation Scheme

Sr. No	Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
								Theory				Practical			Total Marks
								Sessional Exam		University Exam		Internal		Uni.	
			Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4	4CS02IDS2	Advance C and Data Structure	4	-	-	4	4	30	1.5	70	3	-	-	-	**100**

Objectives:

- To develop proficiency in problem solving and programming.
- Achieve an understanding of fundamental data structures and algorithms
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced study in Computer Science.

Prerequisites: Basic knowledge of C Language.

Course outline:

Chapter No	Chapter Name	Course Contents	Lect. Hours
1	Arrays	1.1 Representation and Analysis 1.2 address calculation, 1.3 application of arrays 1.4 Character String in C 1.5 Character string operation 1.6 Array as Parameters	5
2	UDF	2.2.call by value & call by reference 2.3.Returning values 2.4.Passing array as parameter 2.3 Passing structure as parameters	3
3	Poineters in C	3.1 Declaring and initializing pointers 3.2 Advantages and disadvantages of pointers 3.3 Passing pointers to functions 3.4 Relation between pointers and arrays	8
4	Memory Allocation in C	4.1 Dynamic Memory allocation in C 4.2 malloc(size), 4.3calloc(n,size),	2

		4.4 realloc(block) 4.5 free()	
5	Algorithm And Data Structure	5.1 What is Algorithm, Problem and Program 5.2 Characteristics of Algorithm 5.3 What is Data Structure 5.4 Types of Data Structure (linear and Non Linear)	2
6	Searching	6.1 Linear Search 6.2 Binary Search	3
7	Sorting	7.1 Bubble Sort 7.2 Selection Sort 7.3 Merge sort 7.4 Insertion Sort 7.5 Quick Sort	7
8	Stack	8.1 What is Stack 8.2 Array Representation and Implementation of stack 8.3 Operations on Stacks: Push, Pop, Peek 8.4 Application of stack	5
9	Queue	9.1 Array representation of Queue 9.2 implementation of queue 9.3 Operations on Queue: Create, Add, Delete 9.4Circular queues 9.5 D-queues	8
10	Linked List	10.1 What is Linked List 10.2 Representation and Implementation of Singly Linked Lists 10.3 Traversing and Searching of Linked List 10.4 Insertion in Singly Linked List 10.5 Deletion in Singly Linked List 10.6 Types Of Linked List	8
11	Tree	11.1 Basic terminology 11.2 Binary trees, Properties of binary trees 11.3 Traversals of a binary tree 11.4 Binary Search Tree	5
		TOTAL	**55**

Books Recommended:

1, "*Data Structure through C/C++",*R.B.Patel, Khanna Publication
2, "*Data and File Structure*", Trembley& Sorenson, TMH Publication
3, "*Data Structure & algorithms Using C*", R.S.Salaria, Khanna Publication
4, "*Data structure through C/C++*", Tennaunbuam
5, "*Let us C*",YKanetkar, BPB Publication(3rd Edition).

Lab – Practical List

PROGRAMS OF POINTERS

NO	DEFINITION
1	Write a program to print address of variable
2	Write a program for pointer arithmetic
3	Write a program for demonstrate chain of pointer
4	Write a program that check whether given no is odd or even using pointer

PROGRAMS FOR ARRAYS

NO	DEFINITION
1	Write a program to insert element in array and print the the sum.
2	Write a program for find maximum and minimum value from array
3	Write a program for insert element at first, last and specific position in one dimensional array
4	Write a program for create and display 2 dimentional matrix
5	Write a program for addition of 2 matrix/subtraction of matrix
6	Write a program for multiplication of 2 matrix
7	Write a program for search element from array

PROGRAMS FOR UDF

NO	DEFINITION
1	Write a function to check whether a given no is prime or not.
2	Write a function to check whether a given no is Armstrong or not (for 153: $1^3+5^3+3^3= 153$)
3	Write a function to print reverse number of a given number
4	Write a function to print sum of digit of a given number
5	Write a function to print factorial of a given number

PROGRAMS OF POINTERS AND ARRAYS

NO	DEFINITION
1	Write a program that print element value and address of array
2	Write a program to print array element using pointer (add number (p+i))
3	Write a program for create and display array using pointer (using p++)
4	Write a program that print sum of array using pointer
5	Write a program that print largest and smallest number using pointer
6	Write a program that print how many odd number and even number from array pointer
7	Write a program that print how many positive, negative and zero number from array using pointer
8	Write a program that print sum of odd numbers and even numbers from array of 10 elements using pointer
9	Write a program that find largest number among numbers using ARRAYS OF POINTER
10	Write a program that print each character and its address in a given string using pointer
11	Write a program that print length of given string using pointer
12	Write a program that copy one string into another using pointer
13	Write a program that concat two string into a third string
14	Write a program to convert string into uppercase.
15	Write a program to print reverse string

PROGRAMS OF UDF AND ARRAY

NO	DEFINITION
1	Write a program that pass string into function and print string
2	Write a program that pass array to function and return the sum
3	Write a program that print largest number from array using udf
4	Write a program that print reverse string using udf

PROGRAMS OF SEARCHING

NO	DEFINITION
1	Write a Program that search a number using Linear search
2	Write a Program that search a number using Binary search

PROGRAMS OF SORTING

NO	DEFINITION
1	Write a Program that sort an array using Selection Sort
2	Write a Program that sort an array using Bubble Sort
3	Write a Program that sort a list using Insertion Sort
4	Write a Program that sort a list using Merge Sort
5	Write aProgram that implement Quick Sort

PROGRAMS OF STACK

NO	DEFINITION
1	Write a program that Enter data and Delete Data in a Stack (Push and Pop Operation) using array
2	Write a program that print reverse string using stack

PROGRAMS OF QUEUE

NO	PROGRAM DEFINITION
1	Write a program that implement simple queue using array
2	Write a program that implement circular queue using array
3	Write a program that implement dequeue using array

PROGRAMS OF LINK LIST

NO	PROGRAM DEFINITION
1	Write a program having character type node in linked list
2	Write a program having string type node in linked list
3	Write a program for create and traversal of singly linked list.
4	Write a program for insertion at various position in singly linked list
5	Write a program for deletion in singly linked list
6	Write a program that create and display doubly linked list
7	Write a program for insertion in doubly linked list
8	Write a program for deletion in doubly linked list
9	Write a program for create and traversal circular linked list
10	Write a program for create and traversal of header linked list