

Course: BTech Semester: 2

Prerequisite: Basic knowledge of Programming

Rationale: To Write programs in C to solve the problems and To provide required knowledge to implement linear data structures such as arrays. To understand the various steps involved in programing development. To understand the Basic concepts of linear and non-linear Data Structures To learn how to learn and write modular and readable c programing

Teaching and Examination Scheme

	Teaching Scheme				Examination Scheme					
Lecture	Tutorial	Lab		Credit	Internal Marks		External Marks		Total	
Hrs/Week	Hrs/Week	Hrs/Week	Hrs/Week	Credit	Т	CE	Р	Т	Р	
3	-	2	-	4	20	20	20	60	30	150

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content		$oldsymbol{W}$ - Weightage (%) , $oldsymbol{T}$ - Teaching hours						
Sr.	Topics		w	Т				
1	Dynamic Mo Pointer	emory Allocation: malloc, calloc, realloc and free, Array of pointers, Programing Applications, Dangling	10	6				
2	Preprocessor Directives: File Inclusion, Macros, Conditional Compilation and Pragmas							
3	Enumerator Structures: structures A	s, Structures, Unions: s: Enumerator Types Declaration Initialization Accessing Structures, Complex Structures, Structure and Functions Array of rrays within structures Anonymous structures Nested structures pointers in structures Self-referential tructure Padding fields	15	15				
4	Searching and Sorting: Selection sort, Bubble Sort, ,Insertion sort, Quick sort and Merge Sort Linear and Binary Searching Techniques		30	3				
5	Data Structures: List- Linear List: Singly Linked List - CRUD operations Double Linked List - CRUD operation Linked List- CRUD operations		35	15				

Reference Books

1.	Fundamentals of Data Structures in C, 2ND eDITION, E.Horowitz, S,.Sahni and Susan Anderson- Freed, Universities Press (TextBook)
2.	Computer Programming & Data Structures - E. Balaguruswamy,4th Edition TMH
3.	C & Data Structures - P . Padmanabham, Third Edition, B.S Publications
4.	Classic Data Structures - D.samanta

Course Outcome

After Learning the Course the students shall be able to:

After Completion of course students shall be able to:

- 1. Learn to use data structures concepts for realistic Problems
- 2. Ability to identify appropriate data structures for Solving computing problems in respective language
- 3. Ability to solve problems independently and think critically.
- 4. Understand the concept of File Management



List of Practical

- Write a c program to increase or decrease the existing size of an 1D array.
 Write a c program on 2D array to Increase & Decrease
 - i) No of subarrays
 - ii) elements in the subarrays
- 2.

1.

- 1. Write a to display present date and time using c language.
- 2. Write a c program to demonstrate pre-processor directives
- i) Macros
- ii) Conditional Compilation
- 3.
- 1. Write a C program that uses functions to perform the following Operations.
- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers
- 2. Write a c program to store records of n students based on roll_no, name, gender and 5 subject marks
- i) Calculate percentage each student using 5 subjects.
- ii) Display the student list according to their percentages.

4.

Write a C program to store n employee records based on EMP_ID,EMP_NAME,EMP_DEPTID,EMP_PHNO,EMP_SALARY and display all the details of employees using EMP_NAME in sorted order.

- 5.
- 1. Write a c program to implement selection Sort & Bubble sort
- 2. Write a C program to reverse the elements within a given range in a sorted list. Example:

input: 10

91243467810

38

output: 1 2 8 7 6 4 4 3 9 10

the sorted list of given array elements is 12344678910, after reversing the elements with in the range 3 and 8 is 12876443910

- 6.
- 1. Write a c program to implement Insertion sort & Quick sort
- 2. Write a c program to sort the given n integers and perform following operations
- i) Find the products of every two odd position elements
- ii) Find the sum of every two even position elements Explanation:

Input:9 198354726 Output:3153563

6 10 14

The sorted list of given input is $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9$, the product of alternative odd position elements is $1^*3 = 3,3^*5=15,5^*7=35...$ and the sum of two even position elements 2+4=6,4+6=10.

7.

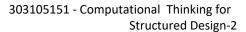
Write a C Program to implement Merge Sort.

8.

1. Write a c program to sort in ascending order and reverse the individual row elements of an mxn matrix



	input: 3 4
	1 4 2 3
	7 8 10 9
	6 3 5 2
	output:
	4321
	10 9 8 7
	6532
	2. Write a c program to sort elements in row wise and print the elements of matrix in Column major order
	Input: 3 4
	1423
	78109
	6352
	Output:
	172
	283
	395
	4 10 6
	Explanation:
	The sorted matrix according to the conditions is
	1234
	78910
	2356
	after sorting matrix the elements as to be printed in column major order
	172
	283
	395
	4 10 6
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9.	
9.	Write a c program to perform linear Search.
9.	Write a c program to perform linear Search. Write a c program to perform binary search.
9.	
	2. Write a c program to perform binary search.
	Write a c program to perform binary search. Write a c program to Create a single Linked list and perform Following Operations
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ח	Insertion	Refore a	particular	node
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- E. Insertion at specific position
- F. Search a particular node
- G. Return a particular node
- H. Deletion at the beginning
- I. Deletion at the end
- J. Deletion after a particular node
- K. Deletion before a particular node
- L. Delete a particular node
- M. Deletion at a specific position

13.

Write a c program to Create a Circular single Linked list and perform Following Operations

- A. Insertion After a particular node
- B. Insertion Before a particular node
- C. Search a particular node
- D. Return a particular node
- E. Deletion before a particular node
- F. Delete a particular node

14.

Write a c program to Create a Circular DoubleLinked list and perform Following Operations

- A. Insertion After a particular node
- B. Insertion Before a particular node
- C. Search a particular node
- D. Return a particular node
- E. Deletion before a particular node
- F. Delete a particular node