



DHANALAKSHMI SRINIVASAN
INSTITUTE OF TECHNOLOGY
(Approved by AICTE, New Delhi & Affiliated to Anna University)
NH - 45, Trichy - Chennai Trunk Road,
SAMAYAPURAM, TRICHY - 621 112.
E.mail: dsit2011@gmail.com Website: www.dsit.ac.in

COURSE PLAN

Subject code: EC8393

Branch/Year/Sem/Section: B.E BME/II/IV

Subject Name: FUNDAMENTALS OF DATA STRUCTURES IN C

Batch: 2018-2022

Staff Name: R.SATHIYA PRIYA

Academic year: 2019-2020

COURSE OBJECTIVE

1. To learn the features of C
2. To learn the linear and non-Linear data structures
3. To explore the applications of linear and non-linear data structures
4. To learn to represent data using graph data structure
5. To learn the basic sorting and searching algorithms

TEXT BOOK:

- T1.** PradiDey and ManasGhosh, —Programming in C, Second Edition, Oxford University Press, 2011.
- T2.** Ellis Horowitz, SartajSahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, Second Edition, University Press, 2008.

REFERENCES:

- R1** Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
- R2** Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms, Pearson Education, 1983.
- R3** Robert Kruse, C.L.Tondo, Bruce Leung, ShashiMogalla , — Data Structures and Program

WEB RESOURCES

- W1 <https://www.includehelp.com/data-structure-tutorial/>
- W2 https://www.tutorialspoint.com/data_structures_algorithms/index.htm
- W3 https://www.udemy.com/course/data-structures-and-algorithms-in-c/?utm_source=adwords&utm_medium=udemyads&utm_campaign=

TEACHING METHODOLOGIES:

- BB - BLACK BOARD
- VIDEO - VIDEO TUTORIAL
- PPT - POWER POINT PRESENTATION



DHANALAKSHMI SRINIVASAN
INSTITUTE OF TECHNOLOGY
(Approved by AICTE, New Delhi & Affiliated to Anna University)
NH - 45, Trichy - Chennai Trunk Road,
SAMAYAPURAM, TRICHY - 621 112.
E.mail: dsit2011@gmail.com Website: www.dsit.ac.in

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EC8393 FUNDAMENTALS OF DATA STRUCTURES IN C L T P C3 0 0 3

UNIT I C PROGRAMMING BASICS 9

Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in C – Managing Input and Output operations – Decision Making and Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional and Two-dimensional arrays. Strings-String operations – String Arrays. Simple programs-sorting searching – matrix operations.

UNIT II FUNCTIONS, POINTERS, STRUCTURES AND UNIONS 9

Functions – Pass by value – Pass by reference – Recursion – Pointers Definition – Initialization – Pointers arithmetic. Structures and unions-definition – Structure within a structure -Union Programs using structures and Unions – Storage classes, Pre-processor directives.

UNIT III LINEAR DATA STRUCTURES 9

Arrays and its representations – Stacks and Queues – Linked lists – Linked list-based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT IV NON-LINEAR DATA STRUCTURES 9

Trees – Binary Trees – Binary tree representation and traversals – Binary Search Trees Applications of trees. Set representations -Union-Find operations. Graph and its representations – Graph Traversals.

UNIT V SEARCHING AND SORTING ALGORITHMS 9

Linear Search – Binary Search. Bubble Sort, Insertion sort – Merge sort Quick sort -Hash tables – Overflow handling

1. At the end of the course, the student will be able to:

CO1	Understand linear and non-linear data structure operations using C (K2)
CO2	Apply linear / non-linear data structure for any given data set.(K3)
CO3	Apply hashing concepts for a given problem(K3)
CO4	Create Binary search tree traversal (K6)
CO5	Evaluate the sorting algorithm for an application (K5)

2. Course Outcome (CO) Assessment:

CO	Knowledge Level	Internal Test		
		1	2	3
CO1	K2			
CO2	K3			
CO3	K3			
CO4	K6			
CO5	K5			

Cognitive Domain:

K1- Remember; K2- Understand; K3-Apply; K4- Analyse;K5- Evaluate; K6-Create

3. Programme Outcomes

Students graduating from Electrical and Electronics Engineering should be able to:

PO1	Engineering knowledge	Strong foundation in core Computer Science and Engineering, both theoretical and applied concepts
PO2	Problem analysis	Identify, Formulate, Ability to apply knowledge of mathematics, science and engineering to real-life problem solving and reaching validated conclusions related to computer science.
PO3	Design/development of solutions	Ability to analyze, design, model, and develop complex software and information management systems that meet the specified needs with appropriate consideration for the public health and Safety and the cultural societal and environmental considerations.
PO4	Conduct investigations of complex problems	Ability to use research– based knowledge and study methods including analysis, design , coding

		implementation, testing and interpretation of data, to provide valid Conclusions
PO5	Modern tool usage	Convention of recent techniques, modern engineering and IT tools with an understanding of the limitations
PO6	The engineer and society	Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Computer Science and engineering Practice.
PO7	Environment and sustainability	Understanding the impact of Computer Science and Engineering solutions in the societal and human context.
PO8	Ethics	Understand and apply professional ethical responsibility
PO9	Individual and team work	Ability to function effectively within teams in Software projects.
PO10	Communication	Ability to communicate effectively, both in writing and oral makes effective presentations to provide and obtain clear instructions
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
PO12	Life-long learning	Recognize the need for and have the preparation and ability to engage in independent and life-long learning.

4. Programme Specific Outcomes

After the successful completion of the U.G. programme in Computer Science and Engineering, Graduates will be able to:

PSO1:	Foundation of mathematical concepts: To use mathematical methodologies to crack problem using suitable mathematical analysis, data structure and suitable algorithm.
PSO2:	Foundation of Computer System: The ability to interpret the fundamental concepts, methodology of computer systems and to understand the functionality of hardware and software aspects.
PSO3:	Foundations of Software development: The ability to grasp the software development lifecycle and methodologies of software systems. Possess competent skills and knowledge of software design process.

5. CO-PO Mapping Table:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	2	-	2	1	-	1	3
CO2	2	-	-	-	-	1	-	-	2	-	2	1	-	1	3
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	2	-	-	-	1	-	-	-	-	-	-	2	-	-
CO5	2	2	-	-	-	1	-	-	2	-	-	-	2	-	1
Weighted average	1	2	-	-	-	1	-	-	2	-	2	1	2	1	3

Topic No	Topic Name	Books For reference	Page No	Teaching Methodology	No of periods required	Cumulative periods
UNIT I C PROGRAMMING BASICS						(9)
1.	Structure of a C program – compilation and linking processes	T1	48	BB	1	1
2.	Constants, Variables –Data Types	T1	50	BB	1	2
3.	Expressions using operators in C	T1	131	BB	1	3
4.	Managing Input and Output operations	T1	96	BB	1	4
5.	Decision Making and Branching	T1	124	BB	1	5
6.	Looping statements	T1	132	BB	1	6
7.	Arrays –Initialization –Declaration –One dimensional and Two-	T1	169	BB	1	7
8.	Strings-String operations –String	T1	182	BB	1	8
9.	Simple programs-sorting , searching –matrix operations.	T1	350	BB	1	9
LEARNING OUTCOME:						
At the end of unit , the students will be able to						
<ul style="list-style-type: none"> • Understand the basic concept of Expressions using operators in C • To analyze Looping statements. 						

UNIT II FUNCTIONS, POINTERS, STRUCTURES AND UNIONS(9)

10.	Functions –Pass by value –Pass by reference	T1	214-217	BB	2	11
11.	Recursion	T1	218	BB	1	12
12.	Pointers Definition –Initialization –Pointers arithmetic.	T1	168	BB	1	13
13.	Structures and unions-definition	T1	172	BB	1	14
14.	Structure within a structure	T1	175	BB	1	15
15.	Union Programs using structures and Unions	T1	180	BB	1	16
16.	Storage classes	T1	182	BB	1	17
17.	Pre-processor directives	T1	184	BB	1	18

LEARNING OUTCOME:20**At the end of unit , the students will be able to**

- Gain the knowledge to write a program of structures
- Understand the concept of Storage classes

UNIT III LINEAR DATA STRUCTURES (9)

18.	Arrays and its representations	T1	169	BB	1	19
19.	Stacks and Queues	T1	493	BB	1	20
20.	Linked lists	R2	44-45	BB	2	22
21.	Linked list-based implementation of Stacks	R2	46-47	BB	1	23
22.	Linked list-based implementation of Queue.	R2	48-49	BB	1	24
23.	Evaluation of Expressions	R2	50-54	BB	1	25
24.	Linked list based polynomial addition.	R2	58-60	BB	2	27

LEARNING OUTCOME:**At the end of unit , the students will be able to**

- Implement linear and non-linear data structure operations using C

UNIT IV NON-LINEAR DATA STRUCTURES (9)

25.	Trees –Binary Trees	T1	501	BB	1	28
26.	Binary tree representation and traversals	T1	507	BB	2	30
27.	Binary Search Trees	R2	511	BB	1	31
28.	Applications of trees.	R2	514	BB	1	32
29.	Set representations	R2	49	BB	1	33
30.	Union-Find operations	R2	129	BB	1	34
31.	Graph and its representations	R2	50	BB	1	35
32.	Graph Traversals	R2	56	BB	1	36

LEARNING OUTCOME:35

At the end of unit , the students will be able to

- Understand the concept of Tree traversals.
- Get the knowledge about Graph traversal

UNIT V SEARCHING AND SORTING ALGORITHMS(9)

33	Linear Search	R2	63	BB	1	37
34	Binary Search	R2	66	BB	1	38
35	Bubble Sort	R2	69	BB	1	39
36	Insertion sort	R2	71	BB	1	40
37	Merge sort	R2	74	BB	1	41
38	Quick sort	R2	77	BB	2	43
39	Hash tables	R2	81	BB	1	44
40	Overflow handling	T2	107	BB	1	45

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Appropriately choose the sorting algorithm for an application

CONTINUES INTERNAL ASSESSMENT DETAILS

ASSEMENT NUMBER	I	II	MODEL
TOPIC NO.(UNIT)	1-17 (1 st & 2 nd units)	19-36 (3 rd & 4 th units)	1-45 (units 1-5)

ASSIGNMENT DETAILS

ASSIGNMENT NUMBER	I	II	III
TOPIC NUMBER FOR REFERENCE	1-17 (1 st & 2 nd units)	19-36 (3 rd & 4 th units)	1-45 (units 1-5)
DEAD LINE	27-01-2020	10-02-2020	02-03-2020

ASSIGNMENT NUMBER	DESCRIPTIVE QUESTIONS/TOPIC (Minimum of 8 Pages)
I	Write a C program for Matrix Multiplication
II	Explain about linked list implementation of polynomial addition
III	Quick sort Algorithm with example