SWARNANDHRA

College of Engineering & Technology (Autonomous)
NARSAPUR-534 280

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LESSON PLAN

Course Code	Course Name	Regulation	Academic year	Year / Semester	Branches	Contact Periods/Week	Sections
23CS2T01	**Data Structures**	**R23**	**2024- 2025**	**B.Tech / II Sem**	Common to **CSE, IT,AI&ML, CSE-DS,CSE-CS,CSE-BS,AIDS**	**5**	All

COURSE OUTCOMES

At the end of the course, student will be able to

CO1: Acquire the basic concepts of data structures in organizing and accessing data efficiently in algorithms.**(K2)**

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. **(K3)**

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. **(K3)**

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. **(K4)**

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks,queues, Trees. **(K3)**

CO6: Design hash-based solutions for specific problems.**(K2)**

UNIT- I

Unit No.	Course Outcomes		Topics/Activity	Ref Text Book	No. of Periods	Total Periods	Delivery Method
1	**CO1:Acquire the basic concepts of data structures in organizing and accessing data efficiently in algorithms.(K 2)**	**Introduction to Data Structures**				**14**	Lecture, Assignment, Interaction
		1.1	Definition	T1, R2	1		
		1.2	Classification of data structures	T1, R2	1		
		1.3	Abstract data types (ADTs) and their implementation	T1, R2	1		
		1.4	Overview of time and space complexity analysis	T1, R2	1		
		1.5	Searching Techniques: Linear	T1, R2	1		
		1.6	Binary Search	T1, R2	1		
		1.7	Sorting Techniques: Bubble sort,	T1, R2	1		

		1.8	Selection sort,	T1, R2	1		
		1.9	Insertion Sort	T1, R2	1		
		1.10	Quick Sort	T1, R2	2		
		1.11	Merge Sort	T1, R2	2		
		1.12	Time Complexity Ananlysis for Sorting Techniques	T1, R2	1		

UNIT- II

Unit No.	Course Outcomes		Topics/Activity	Ref Text Book	No. of Periods	Total Periods	Delivery Method
2	CO2:Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. (K3)		**Linked Lists**			10	Lecture, Assignment, Interaction
		2.1	Singly linked lists: representation	T2,R3	3		
		2.2	Operations	T2, R3			
		2.3	Doubly linked lists	T2, R3	2		
		2.4	Circular linked lists,	T2, R3	2		
		2.5	Comparing arrays and linked lists	T2, R3	2		
		2.6	Applications of linked lists.	T2, R3	1		
			MID I EXAMINATION 18th week				

UNIT- III

Unit No.	Course Outcomes		Topics/Activity	Ref Text Book	No. of Periods	Total Periods	Delivery Method
3	CO3:Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. (K3)		**Stacks**			12	Lecture, Assignment, Interaction
		3.1	Introduction to stacks: properties and operations,	T2,R3	4		
		3.2	implementing stacks using arrays and linked lists	T2,R3			
		3.3	Applications of stacks: reversing list and Factorial Calculation	T2,R3	2		
		3.4	expression evaluation,	T2,R3	2		
		3.5	backtracking,	T2,R3	2		
		3.6	reversing list and factorial calculation.	T2,R3	2		

UNIT- IV

Unit No.	Course Outcomes		Topics/Activity	Ref Text Book	No. of Periods	Total Periods	Delivery Method
4	CO4:Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. (K4)		**Queues**			15	Lecture, Assignment, Interaction
		4.1	Introduction to queues: properties	T2,R3,R2	2		
		4.2	operations	T2,R3,R2	1		
		4.3	implementing queues using arrays and linked lists,	T2,R3,R2	3		
		4.4	circular queue	T2,R3,R2	2		
		4.5	priority queue	T2,R3,R2	2		
		4.6	Applications of queues in breadth-first search, scheduling.	T2,R3,R2	2		
		4.7	**Deques:** Introduction to deques (double-ended queues),	T2,R3,R2	1		
		4.8	Operations on deques and their applications	T2,R3,R2	2		

UNIT- V

Unit No.	Course Outcomes		Topics/Activity	Ref Text Book	No. of Periods	Total Periods	Delivery Method
5	CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks,queues, Trees. (K3) CO6: Design hash-based solutions for specific problems.(K2)		**Trees**			16	Lecture, Assignment, Interaction
		5.1	Introduction to Trees	T2,R2,R3	2		
		5.2	Properties of Trees	T2,R2,R3	1		
		5.3	Binary Search Tree – Insertion, Deletion & TraversalGraphs.	T2,R2,R3	2		
		5.4	Introduction to graphs, properties	T2,R2,R3	1		

		5.5	representation,Traversal	T2,R2,R3	2		
			Hashing				
		5.6	**Brief** introduction to hashing	T2,R2,R3	1		
		5.7	Collision resolution techniques: chaining	T2,R2,R3	1		
		5.8	open addressing,	T2,R2,R3	1		
		5.9	Hash tables: basic implementation	T2,R2,R3	1		
		5.10	operations,	T2,R2,R3	2		
		5.11	Applications of hashing in unique identifier generation,	T2,R2,R3	1		
		5.12	caching.	T2,R2,R3	1		
Total no. of periods						67	
MID - II Examination during 14th Week							
END EXAMINATIONS							

TEXT BOOKS

T1. Mark Allen Weiss, Data Structures and Algorithms in C, Pearson,2nd Edition.

T2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Fundamentals of data structures in C, Silicon Press, 2008

REFERENCE BOOKS

R1. Kurt Mehlhorn and Peter Sanders, Algorithms and Data Structures: The Basic Toolbox , Springer; 2008 edition.

R2. Brad Miller and David Ranum," Problem Solving with Algorithms and Data Structures" , Franklin, Beedle & Associates (2011) .

R3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein , Introduction to Algorithms,Third Edition,2009.

WEB LINKS

https://www.geeksforgeeks.org/datastructures/
https://www.javatpoint.com/data-structure-tutorial
https://www.w3schools.com/dsa/dsa_intro.php
https://www.techtarget.com/searchdatamanagement/definition/data-structure

S.No.	Course Lecturer	Branch & Section	Sign
1	Mr. K.John Paul	CSE - D & I	
2	Ms.Y.Sherly Priscilla	CSE - A & H	
3	Mr.A.Satish	AIDS	
4	Ms.V.Anusha	AIML -A & B	
5	Mrs. M. Sumalatha	CSE - E & G	
6	Mrs.V.P.V Kumari	DS - A & B	
7	Mrs. K. Swathi	IT- B	
8	Mrs.G.Swapna	CSE - B & F	
9.	Mrs. B. Sri lakshmi	CCS	
10.	Ms. M. Teja Sree	IT-A	
11.	Ms. D. Swathi	CBS	
12.	Ms. M. Doctor Pranati	CSE - C	
Course Coordinator		Mr. K.John Paul	

Course Coordinator **HOD** **Principal**