NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.TECH / CSE		
Course Title	Data Structures		
Course Code	CSPC32	No. of Credits	03
Course Code of Pre-requisite subject(s)	-		
Session	July 2022	Section (if, applicable)	B
Name of Faculty	Dr. M. Sai Krishna	Department	CSE
Email	saikrishna@nitt.edu	Telephone No.	9885648901
Name of Course Coordinator(s) (if, applicable)	NIL		
E-mail	NIL	Telephone No.	NIL
Course Type	Core		

Syllabus (approved in BoS)

UNIT I-Introduction

Development of Algorithms - Notations and analysis - Storage structures for arrays - Sparse matrices - Stacks and Queues: Representations and applications.

UNIT II- Linked List, Stacks, and Queues

Linked Lists - Linked stacks and queues - Operations on polynomials - Doubly linked lists - Circularly linked lists- Dynamic storage management - Garbage collection and compaction.

UNIT III -Trees

Binary Trees - Binary search trees - Tree traversal - Expression manipulation - Symbol table construction – Height balanced trees - AVL trees - Red-black trees.

UNIT IV-Graphs

Graphs - Representation of graphs - BFS - DFS - Topological sort - String representation and manipulations – Pattern matching.

UNIT V Sorting and Searching

Sorting Techniques - Selection - Bubble - Insertion - Merge - Heap - Quick - Radix sort - Address calculation - Linear search - Binary search - Hash table methods.

Text Books

1. J. P. Tremblay, P. G. Sorenson, "An Introduction to Data Structures with Applications", Second Edition, Tata McGraw Hill, 1981.
2. M. Tenenbaum, Augestien, "Data Structures using C", Third Edition, Pearson Education, 2007.
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Addison-Wesley Educational Publishers, 2006

Reference Book

1. Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", Universities Press (I)

Pvt. Ltd., 2008.

COURSE OBJECTIVES

- To find the Time Complexity and Space Complexity for algorithm
- To understand the various techniques of sorting and searching
- To design and implement arrays, stacks, queues, and linked lists
- To understand the complex data structures such as trees and graphs
- To solve real time problems

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Develop programs to implement linear data structures such as stacks, queues, linked lists, etc.	1,2,3,5
2. Apply the concept of trees and graph data structures in real world scenarios	1,3,4,6
3. Appropriately to decide on the data structure for any practical problem	1,3,5,6

COURSE PLAN – PART II

COURSE OVERVIEW

This course emphasizes linear and nonlinear data structures, various programming paradigms, sortings and searching problems.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/ Contact Hours	Topic	Mode of Delivery
1	2 Contact Hours	Development of Algorithms - Notations and analysis - Storage structures for arrays	chalk and board
2	4 Contact Hours	Sparse matrices - Stacks and Queues: Representations and applications.	chalk and board
3	4 Contact Hours	Linked Lists - Linked stacks and queues - Operations on polynomials - Doubly linked lists - Circularly linked lists	chalk and board
4	3 Contact Hours	Dynamic storage management - Garbage collection and compaction.	chalk and board
5	4 Contact Hours	Binary Trees - Binary search trees - Tree traversal - Expression manipulation - Symbol table construction	chalk and board
6	4 Contact Hours	Height balanced trees - AVL trees - Red-black trees.	chalk and board

7	3 Contact Hours	Graphs - Representation of graphs - BFS - DFS - Topological sort	chalk and board
8	4 Contact Hours	String representation and manipulations – Pattern matching.	chalk and board
9	4 Contact Hours	Sorting Techniques - Selection - Bubble - Insertion - Merge - Heap - Quick - Radix sort	chalk and board
10	3 Contact Hours	Address calculation - Linear search - Binary search - Hash table methods.	chalk and board

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test-1	As per Academic schedule	1 hour	20
2	Cycle Test-2		1 hour	20
3	Programming Assginment	-	-	10
4	Quiz	14th Week	-	10
CPA	Compensation Assessment*	As per Academic schedule	1 hour	20
5	Final Assessment *		2 hours	40

*mandatory; refer to guidelines on page 4

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Students' feedback through class committee meetings
2. Feedbacks are collected before final examination through MIS or any other standard format followed by the institute
3. Students, through their Class Representatives, may give their feedback at any time to the course faculty which will be duly addressed.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Email, in-person – after 4.00 pm.

COMPENSATION ASSESSMENT POLICY

1. One compensation assessment will be given after completion of Cycle Test 1 and 2 for the students those who are absent for any assessment due to genuine reason.
2. Compensatory assessments would cover the syllabus of Cycle tests 1 & 2
3. The prior permission and required documents must be submitted for absence.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

➢ At least 75% attendance in each course is mandatory.

➢ A maximum of 10% shall be allowed under On Duty (OD) category.

➢ Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

➢ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

➢ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

➢ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

➢ The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

1. The Course Coordinator is available for consultation during the time intimated to the students then and there.
2. Relative grading adhering to the instructions from the office of the Dean (Academic) will be adopted for the course.

FOR APPROVAL

M. Sai Krishna

Course Faculty _____   **CC-Chairperson** _____   **HOD** _____

Guidelines

a) The number of assessments for any theory course shall range from 4 to 6.

b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.

c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.