NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech Computer Science and Engineering**		
Course Title	**Data Structures**		
Course Code	**CSPC32**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)	**NIL**		
Session	**July 2023**	**Section (if, applicable)**	**A**
Name of Faculty	**Dr. B. Nithya**	**Department**	**CSE**
Official Email	**nithya@nitt.edu**	**Telephone No.**	**0431-2503214**
Name of Course Coordinator(s) (if, applicable**)**	**Not Applicable**		
Official E-mail	**-**	**Telephone No.**	**-**
Course Type (please tick appropriately**)**	☐ **Core course**		

Syllabus (approved in BoS)
Unit – I   Development of Algorithms **-** Notations and analysis - Storage structures for arrays - Sparse matrices - Stacks and Queues: Representations and applications.   **Unit – II**   Linked Lists **-** Linked stacks and queues - Operations on polynomials - Doubly linked lists - Circularly linked lists - Dynamic storage management - Garbage collection and compaction.   **Unit – III**   Binary Trees **-** Binary search trees - Tree traversal - Expression manipulation - Symbol table construction - Height balanced trees - Red-black trees.   **Unit – IV**   Graphs **-** Representation of graphs - BFS, DFS - Topological sort - Shortest path problems. String representation and manipulations - Pattern matching.   **Unit – V**   Sorting Techniques **-** Selection, Bubble, Insertion, Merge, Heap, Quick, and Radix sort - Address calculation - Linear search - Binary search - Hash table methods.   **Text Books**   *1. J. P. Tremblay and P. G. Sorenson, "An Introduction to Data Structures with applications", Second Edition, Tata McGraw Hill, 1981*   *2. M. Tenenbaum and Augestien, "Data Structures using C", Third Edition, Pearson Education 2007.*

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

COURSE OBJECTIVES

- 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

MAPPING OF COs with Pos

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
Develop programs to implement linear data structures such as stacks, queues, linked lists, etc.	1,2
Apply the concept of trees and graph data structures in real world scenarios	1,3
Appropriately to decide on the data structure for any practical problem	1,2,3,4,6,11
Comprehend the implementation of sorting and searching algorithms	1,3,4,5,9,12
Compare Time Complexity and Space Complexity for algorithm	1,2,3,6,11,12

COURSE PLAN – PART II

COURSE OVERVIEW

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

COURSE TEACHING AND LEARNING ACTIVITIES   (Add more rows)

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 Talk
2	4 Contact Hours	Sparse matrices, Stacks and Queues: Representations and applications.	Chalk and Talk
3	4 Contact Hours	Linked Lists - Linked stacks and queues- Operations on polynomials, Doubly linked lists - Circularly linked lists	Chalk and Talk
4	3 Contact Hours	Dynamic storage management, Garbage collection and compaction	Chalk and Talk

5	4 Contact Hours	Binary Trees, Binary search trees, Tree traversal, Expression manipulation, Symbol table construction	Chalk and Talk
6	4 Contact Hours	Height balanced trees, Red-black trees	Chalk and Talk
7	4 Contact Hours	Graphs, Representation of graphs - BFS, DFS - Topological sort	Chalk and Talk
8	4 Contact Hours	Shortest path problems, String representation and manipulations, Pattern matching	Chalk and Talk
9	3 Contact Hours	Sorting Techniques - Selection, Bubble, Insertion, Merge, Heap, Quick, and Radix sort	Chalk and Talk
10	3 Contact Hours	Address calculation, Linear search, Binary search, Hash table methods	Chalk and Talk

COURSE ASSESSMENT METHODS (shall range from 4 to 6**)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Test 1	As per Schedule	1hr	20
2	Test 2	As per Schedule	1hr	20
3	Programming Assignment with Viva	-	-	10
CPA	Retest	After cyle test 1 & cyle test 2	1hr	20
4	Final Assessment	As per Schedule	3hrs	50

*mandatory; refer to guidelines on page 4

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

> ➢ Feedbacks are collected before final examination through MIS or any other standard format followed by the institute
> ➢ Students, through their Class Representatives, may give their feedback at any time to the course faculty which will be duly addressed.
> ➢ The students may also give their feedback during Class Committee Meeting.

COURSE POLICY (including compensation assessment to be specified**)**

MODE OF CORRESPONDENCE (email/ phone etc)

E-mail/Phone

COMPENSATION ASSESSMENT

➤ 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.

➤ The prior permission and required document must be submitted for the 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, IF ANY

The students can clarify their doubts at any time with their faculty member with prior appointments.

FOR APPROVAL

Course Faculty _____

(B. Nithya)

CC- Chairperson _____

HOD _____