Department of Computer Science and Engineering
National Institute of Technology Tiruchirappalli

1. Course Outline			
Course Title	Data Structures		
Course Code	CSPC21		
Department	CSE	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr.R.Mohan
E-mail	rmohan@nitt.edu	**Telephone No.**	0431-250-3210
Course Type	Core Course		

2.Course Overview

This course covers some of the linear, non linear data structures, algorithms with time complexity, and software development.

3. 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

4. Course Outcomes (CO)

- Ability to develop programs to implement linear data structures such as stacks, queues, linked lists, etc.
- Ability to apply the concept of trees and graph data structures in real world scenarios
- Ability to comprehend the implementation of sorting and searching algorithms

5. Course Outcome (CO)	Aligned Programme Outcome (PO)							
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
Ability to develop programs to implement linear data structures such as stacks, queues, linked lists, etc.	S	B	M	M	B	M	B	M
Ability to apply the concept of trees and graph data structures in real world scenarios	S	B	M	B	M	B	B	M
Ability to comprehend the implementation of sorting and searching algorithms	M	B	S	S	M	M	M	B

S = 0.6 M = 0.4 B = 0.0

6. Course Teaching and Learning Activities

L.No	Title	Type		Mode of delivery			
		L	T	C& T	PPT	VL/VC	DEMO
	UNIT I						
1.	Development of Algorithms	√		√			
2.	Notations and analysis	√		√			
3.	Storage structures for arrays	√		√			
4.	Sparse matrices	√		√			
5.	Stacks: Representations	√		√			
6.	Stacks: Application	√		√			
7.	Queue: Representations	√		√			
8.	Queue: Applications	√		√			
	UNIT II						
9.	Linked Lists	√		√			
10.	Linked stacks	√		√			
11.	Linked queues	√		√			
12.	Operations on polynomials	√		√			
13.	Doubly linked lists- Circularly linked lists	√		√			
14.	Circularly linked lists	√		√			
15.	Dynamic storage management	√		√			
16.	Garbage collection and compaction	√		√			
	UNIT III						
17.	Binary Trees	√		√			
18.	Binary search trees	√		√			
19.	Tree traversal	√		√			
20.	Expression manipulation	√		√			
21.	Symbol table construction	√		√			

22.	Height balanced trees	√		√			
23.	Red-black trees	√		√			
	UNIT IV						
24.	Graphs, Representation of graphs	√		√			
25.	BFS, DFS	√		√			
26.	Topological sort	√		√			
27.	Shortest path problems-part 1	√		√			
28.	Shortest path problems- part2	√		√			
29.	String representation and manipulations	√		√			
30.	Pattern matching	√		√			
	UNIT V						
31.	Sorting Techniques- Selection, Bubble	√		√			
32.	Insertion sort, Merge sort	√		√			
33.	Quick sort, Radix sort	√		√			
34.	Address calculation	√		√			
35.	Linear search, Binary search	√		√			
36.	Hash table methods	√		√			

7. Course Assessment Methods

Sl. No.	Mode of Assessment	Week/Date	Duration	Marks
1	Cycle Test – 1	6th week	1 hour	20
2	Cycle Test – 2	12th week	1 hour	20
3	Assignment (Quiz/ Problem solving)	4th, 10th weeks	–	10
4	End Semester Exam	November 2nd week	3 hours	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)
Text Books □ J. P. Tremblay and P. G. Sorenson, "An Introduction to Data Structures with applications", Second Edition, Tata McGraw Hill, 1981 □ M. Tenenbaum and Augestien, "Data Structures using C", Third Edition, Pearson Education 2007 □ Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", Universities Press (I) Pvt. Ltd.

For Senate's Consideration		
 **(Dr . R.Mohan)** Course Faculty	 **(Dr. N. RAMASUBRAMANIAN)** Class Committee Chairperson	 **(Dr. R. LEELA VELUSAMY)** HOD