Department of Computer Science and Engineering
National Institute of Technology Tiruchirappalli

1. Course Outline			
Course Title	Data Structures and Algorithms		
Course Code	CSMI11		
Department	CSE	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr.B.Nithya K. Dakshina
E-mail	nithya@nitt.edu dakshina@nitt.edu	**Telephone No.**	0431 – 2503214 9942667998
Course Type	Minor Course		

2.Course Overview

This course emphasizes algorithm analysis, linear and non linear data structures, sorting and searching problems with time complexity.

3. Course Objectives

- To introduce first level topics covering basics in Algorithms and Data Structures.
- To design and implement linear data structures like Arrays, Stacks, Queues and linked lists.
- To identify the basic properties of non linear data structures like graphs and trees and model simple applications.

4. Course Outcomes (CO)

- Ability to comprehend the basics in algorithms and data structures.
- Ability to solve problems that involve concepts of stack, queue and linked lists.
- Ability to apply the concepts of trees and graphs to provide algorithmic solutions to the real world problems.

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 comprehend the basics in algorithms and data structures.	S	M	S	S	S	M	M	B
Ability to solve problems that involve concepts of stack, queue and linked lists.	S	S	S	M	M	S	B	M
Ability to apply the concepts of trees and graphs to provide algorithmic solutions to the real world problems.	S	S	S	M	M	S	B	M

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.	Abstract Data Types, Asymptotic Notations	√		√			
2.	Running Time Calculation	√		√			
3.	Storage Structures for arrays	√		√			
4.	Stacks: Representations & Operations	√		√			
5.	Stacks: Applications	√		√			
6.	Exercises		√	√			
7.	Queues: Representations & Operations	√		√			
8.	Queues: Applications	√		√			
9.	Programming Assignments & Viva						√
	UNIT II						
10.	Single linked list: Representations	√		√			
11.	Single linked list Operations & Programming examples		√	√			
12.	Circular linked list & its operations	√		√			
13.	Doubly linked list & its operations	√		√			
14.	Stack, Queue using lists	√		√			
15.	Long integer addition & Polynomial Manipulations	√		√			
16.	Programming Assignments & Viva						√
	UNIT III						
17.	Binary trees, Expressions using binary tree	√					
18.	Binary Search Tree & its operations	√		√			
19.	Binary tree traversal , Threaded binary tree	√		√			
20.	Huffman encoding algorithm	√		√			
21.	AVL tree & its operations	√		√			
22.	RBT tree & its operations	√		√			

23.	Exercises in AVL & RBT		√	√			
24.	Splay tree, B-Tree: Operations	√		√			
25.	Exercises in Splay & B Tree		√	√			
26.	Trees, Tree to Binary Tree conversion, Traversal	√		√			
27.	Programming Assignments & Viva						√
	UNIT IV						
28.	Graphs, Representations	√		√			
29.	Transitive closure, BFS, DFS	√		√			
30.	Topological Sorting	√		√			
31.	Shortest Path Problems (Prims & Kruskal)	√		√			
32.	Shortest Path Problems (Dijkstra's & Warshall algorithm)	√		√			
33.	Exercises		√	√			
34.	Programming Assignments & Viva						√
	UNIT V						
35.	Sorting Techniques: Selection , Insertion & Bubble	√		√			
36.	Merge, Quick and Radix sort	√		√			
37.	Address Calculation & Shell Sort	√		√			
38.	Heap Sort	√		√			
39.	Searching: Binary and Linear Search	√		√			
40.	Programming Assignments & Viva						√

7. Course Assessment Methods

Sl. No.	Mode of Assessment	Week/Date	Duration	Marks
1	Cycle Test	After completion of first 2 units	1 hour	15
2	Quiz	After completion of 4 units	1 hour	15
3	Programming Assignments & Viva	After Completion of each and every unit		5 * 4 =20
4	End Semester Exam	As Per Academic Schedule	3 hours	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

Text Books

1. Langsam, Augenstein and Tenenbaum, "Data Structures using C and C++", Second Edition, Pearson Education, 2015.
2. Jean Paul Tremblay, P. G. Sorenson Introduction to Data Structure and its Applications, Second Edition, Mc Graw Hill, 1984

Ref Books:

1.T. Cormen, C. Lieserson, R. Rivest, and C. Stein, "Introductions to Algorithms", Prentice-Hall/India, 3rdedition, 2009

2.Ellis Horowitz, Dinesh Mehta, S. Sahani. Fundamentals of Data Stuctures in C++ , Universities Press. 2007.

9. Course Exit Survey

- Feedbacks are collected before every Cycle Test and after the End semester exam in the feedback forms*.
- Suggestions from the students are incorporated for making the course more understanding and interesting.
- Students, through their Class Representatives, may give their feedback at any time to the course faculty which will be duly addresses.
- The students may also give their feedback during Class Committee Meeting.

*** See Annexure 1**

10. Course Policy (including plagiarism, academic honesty, attendance, etc.)

Attendance: Minimum 75% is mandatory to write the end semester examination. Students having attendance 65% to 74% are eligible for the end semester exam only after attending the extra classes and submitting assignments. Students have to redo the course, if they have less than 65% of attendance.

Medical Certificate/ On Duty Certificate should be submitted immediately after rejoining.

11. Additional Course Information

The students can get their doubts clarified at any time with their faculty member with prior appointment.

FOR SENATE'S CONSIDERATION

Course Faculty (B. Nethaji) K. Dakshina (K. DAKSHINA) **CC-Chairperson** S. Selvakumar 03 01 17 **HOD** 3/1/2017