Department of Computer Science and Engineering
National Institute of Technology Tiruchirappalli

1. Course Outline			
Course Title	Data Structures		
Course Code	CSPC 21		
Department	CSE	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr. Kunwar Singh
E-mail	kunwar@nitt.edu	**Telephone No.**	0431 – 2503212
Course Type	PC		

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						√
	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	√		√			

No.	Topic						
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 I	5th week	1 hour	20
2	Cycle Test II	10th week	1 hour	20
3	Assignments, attendance, and performance	3rd, 6th, 9th , 12th week	-	10
5	End Semester Exam	November 2nd week	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.

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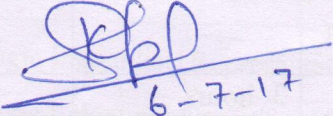
Attendance: Minimum 75% is mandatory to write the end semester examination. Students having attendance 65% to 74% are eligible for the end semester exam only after attending the extra classes and submitting assignments. Students have to redo the course, if they have less than 65% of attendance.

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

6-7-17

Course Faculty Dr. KUNWAR SINGH   CC-Chairperson _____   HOD _____

ANNEXURE 1

Feedback Form (Before cycle Test)

S. No	Question	Yes/No	Reason / Suggestions
1.	Were the classes handled as per schedule?		
2.	Does the teacher encourage discussion and clear doubts?		
3.	Were the Lectures well prepared?		
4.	Did the teacher communicate well?		
5.	Was the teacher available for consultation outside classroom?		
6.	Were the programming assignments useful and instilled confidence in you?		
7.	Which areas do you need more attention?		
8.	Where do you want the teacher to improve?		

Feedback form (Last Working Day)

S. No	Question	Yes/No	Reason / Suggestions
1.	Were the Cycle test papers valued and distributed in time?		
2.	Was the Scheme of evaluation of cycle tests discussed in the class?		
3.	Was the teacher impartial and offered counseling when required?		
4.	Was the teacher knowledgeable and made the course interesting?		
5.	Was the prescribed syllabi entirely completed?		
6.	Were the suggestions incorporated in the course to an extent?		
7.	Whether the Course Objectives are met?		
8.	Overall I am satisfied with the quality of the course		