



Department of Computer Applications National Institute of Technology-Tiruchirappalli

1. COURSE OUTLINE TEMPLATE												
Course Title	DATA STRUCTURES LAB USING C											
Course Code	CA 701	No. of Credits	2									
Department	Computer Applications	Faculty	Dr. U. Srinivasulu Reddy									
Pre-requisites Course Code	NA											
PAC-Chairman	Dr. G. Gangadharan											
Other Course Teacher(s)/Tutor(s) E-mail	usreddy@nitt.edu	Telephone No.	3027, 3746									
Course Type	Core course											
2. COURSE OVERVIEW												
<p>The course is intended to provide the foundations of the practical implementation and usage of algorithms and data structures. The primary objective is to ensure that the students evolves into a competent programmer capable of designing and analyzing implementation of algorithms and data structures for different kind of problems. The secondary objective is to expose the student to the algorithm analysis technique, to the theory reductions, and to the classification of problems into complexity classes like NP.</p>												
3. COURSE OBJECTIVES												
<p>→ Exercises for learning basic features of C and exercises to implement various data structures for real world applications</p>												
4. COURSE OUTCOMES (CO)												
<p>Students will be able to</p> <ul style="list-style-type: none"> → Write C programs for solving any problems → Implement linear and nonlinear data structures to solve real-time problems → Perform searching and sorting techniques to different application domains → Implement different design strategies to solve complex 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	PO-9	PO-10	PO-11	PO-12
Write C programs for solving any problems	H	M				M				H		

Implement linear and nonlinear data structures to solve real-time problems	M	M			H							
Perform searching and sorting techniques to different application domains		L			H			H	H		L	H
Implement different design strategies to solve complex problems	H	M				M				H		

6. COURSE TEACHING AND LEARNING ACTIVITIES			
Week	Lab	Topic	Mode of Delivery
1	Lab I	Given a seat matrix where column represents branches, row represents colleges and the cell data hold number of seats vacant, create a function that allocate seats for n students based on their preferences. User preferences should be in string. Give provision to convert it into numerical index before allocating seat. Give appropriate error message if there is no vacancy.	Power point presentation
2	Lab II(A)	Given an Arithmetic expression involving at least 5 variables. Write a program to generate postfix notation for the expression and evaluate it for various user inputs using appropriate data structure	Power point presentation
	Lab II(B)	Given a sequence of characters typed on a word file. Write a program to perform undo and redo operation on the characters using appropriate data structures	Power point presentation
3	Lab III	Given a metadata of video lectures (Video ID, Subject, Topic, Duration, Date Created, URL) and the course syllabus given as a sequence of phrases separated by hyphen (-) in a text file. Create a sequence of video metadata so that it can be played continuously according to the syllabus. Write a C++ code using suitable data structures. Ensure that video metadata sequence is accessed only in forward sequence.	Power point presentation

4	Lab IV	Construct a tree that represents an HTML file where each node represents the tag name such as <HTML>, <Head>, <Body> etc. at appropriate levels. Provide options to display the content if the tag name is given to display the parent node, child node and sibling nodes.	Power point presentation
5	Lab V	Assume an application requires list of User ID, Password need to be stored and accessed randomly. Use appropriate data structure to store and retrieve them. Check for the strength of the password before storing and display its strength like weak, medium, strong and very strong	Power point presentation
6	Lab VI	Given a set of rules used to sanction loan for a customer in a bank in the form of attribute no., attribute, condition, true value, false value (ex>101, Age, Young, Salary, Experience), represent them as a decision tree. For a given details of a customer, display your decision regarding a sanctioning of loan based on decision tree.	Power point presentation
7	Lab VII	Define an efficient and general sorting algorithm to sort any data. Create a phone book and sort the phone book based on different fields such as phone no, name, email id etc. using the generic sorting algorithm	Power point presentation
8	Lab VIII	Create a phone book with options to search for names in phonebook using Tree data structure. Implement the same using Trie data structure and observe the efficiency.	Power point presentation
9	Lab IX	Given a set of FB account details as name, education, friends list and posts, link all the FB accounts based on friends list using appropriate data structure. Create an application that performs following activities (i) List friends of a given account and print number of friends (ii) DFS/BFS (iii) Assign edge weights based on likes	Power point presentation
10	Lab X	Create a structure that represents the details of Indian Citizen including Adhar number. Construct a B+ tree to store and access the data based on Adhar number.	Power point presentation

7. COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Model Lab	10 th week	3 hrs	25
2	Semester	November		75

8. ESSENTIAL READINGS : Textbooks, reference books, etc

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", 3rd Edition, MIT Press, 2009.
2. S. Lipschutz and G.A.V. Pai, "Data Structures", Tata McGraw-Hill, 2010.
3. M.A. Weiss, "Data Structures and Problem Solving using Java", 4th Edition, Addison Wesley, 2009.
4. D. Samanta, "Classic Data Structures", 2nd Edition, PHI, 2009. 5. P. Brass, "Advanced Data Structures", Cambridge University Press, 2008.

9. COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. The students through the class rep may give their feedback at any time to the course coordinator which will be duly addressed.
2. The students may also give their feedback during Class Committee meeting.
3. 'Course Outcome Survey' form will be distributed on the last working day to all the students and the feedback on various rubrics will be analyzed.
4. The COs will be computed after arriving at the final marks.

10. COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

At classes:

Interactive and productive interactions are anticipated. Abusive terms are highly restricted. Attendance is noted for every class. Appreciate if they are willing to prepare for placement and participating social services after informing properly to the department.

Exam Policy:

Exams are equal to all the students. No privileges will be given to any one at any cost. Absentees on cycle tests won't be allowed for end semester examinations. Assignments are mandatory and should be submitted by the notification of the teacher.

Basic Policies on dishonest or Misconduct:

Students are encouraged to come with notebooks and encouraged to note down from teachers lecture. Asked to avoid electronic gadgets and unwanted notes at the time of examinations. Copying and re using existing notes for assignments are not appreciable.

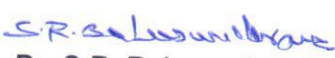
11. ADDITIONAL COURSE INFORMATION

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

For Senate's Consideration


Dr. U. Srinivasulu Reddy
Course Faculty


Dr. G. Gangadharan
PAC-Chairperson


Dr. S.R. Balasundaram
HOD