NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF COMPUTER APPLICATIONS

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech. (Minor)**		
Course Title	**Data Structures and Applications**		
Course Code	**CAMI14**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)			
Session	**Jan. 2020**	**Section (if, applicable)**	
Name of Faculty	**Dr. R. Eswari**	**Department**	**Computer Applications**
Email	**eswari@nitt.edu**	**Telephone No.**	**0431-2503744**
Name of Course Coordinator(s) (if, applicable)			
E-mail		**Telephone No.**	
Course Type	☐ **Core course**	☑ **Elective course**	

Syllabus (approved in BoS)

Linear data Structures – Arrays, Structures, Linked Lists – Singly, Doubly, Circular, XOR, VList, Skip, Jump List, Stack: Definition and examples, Representing Stacks - Queues: Definition and examples, priority queue, Deque, IRD, ORD – Applications of Stack, Queue and Linked Lists- Hashing

Binary Trees – Binary Tree Representations – node representation, internal and external nodes, implicit array representation - Operations on binary trees – Binary tree Traversals - Representing Lists as Binary Trees

Graphs – Representation – Linked representation of Graphs – Graph Traversals.

Single-source shortest path algorithms – Bellman-Ford algorithm and Dijkstra's algorithm- Transitive closure -Topological sort

Basic sorting techniques – selection sort, bubble sort, insertion sort and merge sort – Basic Search Techniques – linear search and binary search –Search Trees – Tree searching

References:

1. S. Lipschutz and G.A.V. Pai, “Data Structures”, Tata McGraw-Hill,2010.
2. M.A.Weiss, “Data Structures and Problem Solving using Java”, 4th Edition, Addison Wesley,2009.
3. P. Brass, “Advanced Data Structures”, Cambridge University Press,2008.
4. M.J.Augestein, Y.Langsam and A.M. Tenenbaum, “Data Structures using Java", Pearson Education, 2004.
5. R. Kruse and C.L. Tondo, “Data Structures and Program Design in C”, 2nd Edition, Prentice Hall,1996.
6. T.A.Standish, “Data structures, Algorithms and Software principles in C”, Addison Wesley, 1994.

COURSE OBJECTIVES

To introduce different data structures; searching and sorting techniques and their applications

Mapping of COs with POs

Course Outcomes	**Programme Outcomes (PO) (**Enter Numbers only**)**
1. Use linear and nonlinear data structures to solve real-time problems	1,2,3,4,5
2. Apply basic searching and sorting techniques in different application domains	1,2,3,4,5

COURSE PLAN – PART II

COURSE OVERVIEW

This course covers topics on introduction, linear data structures, arrays, structures, linked lists, stacks, queues, applications and hashing. It covers topics on non-linear data structures, graphs, trees, binary trees and operations on them. It consists of topics on applications like single-source shortest path algorithms, transitive closure and topological sort. It deals with basic sorting techniques and basic search techniques.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	**Week/Contact Hours**	**Topic**	**Mode of Delivery**
1	Week1 / 3hrs	Linear data Structures – Arrays	Online
2	Week 2 / 3hrs	Linked Lists – Singly, Doubly, Circular, Stack: Definition and examples, Representing Stacks	-do-
3	Week 3 / 3hrs	Queues - Definition and examples, priority queue, Deque, IRD, ORD	-do-

4	Week 4 / 3hrs	Hashing, Binary Trees – Introduction, node representation, internal and external nodes, implicit array representation	-do-
5	Week 5 / 3hrs	Binary Tree Representations –- Operations on binary trees – Binary tree Traversals - Representing Lists as Binary Trees	-do-
6	Week 6 / 3hrs	Constructing unique binary trees, Binary Search Tree Introduction	-do-
7	Week 7 / 3hrs	BST – search, insertion, deletion	-do-
8	Week 8 / 3hrs	Graphs – Representation – Linked representation of Graphs	-do-
9	Week 9 / 3hrs	Graph Traversals, Single-source shortest path algorithms – Bellman-Ford algorithm	-do-
10	Week 10 / 3hrs	Dijkstra's algorithm- Transitive closure -Topological sort	-do-
11	Week 11 / 3hrs	Basic sorting techniques – selection sort, bubble sort, insertion sort	-do-
12	Week 12 / 3hrs	merge sort, quick sort	-do-
13	Week 13 / 3hrs	Basic Search Techniques, linear search, binary search	-do-

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle test1	Week 6	1 Hr	20
2	Cycle test2	Week 10	1 Hr	20
3	Problem solving	Week 4, Week7, Week 11		30
4	Compensation Assessment	Week 13	1 Hr	20
5	Final Assessment	At the end of course	2 hrs	30

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

- The students through the class representative 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)
The students can get the availability of faculty member over phone and email. They can get their doubts clarified at any time with their faculty member.

COMPENSATION ASSESSMENT
One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- 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

FOR APPROVAL

Course Faculty 29/01/2021 **CC-Chairperson** **HOD**