DEPARTMENT OF COMPUTER APPLICATIONS
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
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)	C- Language		
Session	Jan -2023	Section (if, applicable)	
Name of Faculty	Dr. B.Balaji	Department	Computer Applications
Email	balaji@nitt.edu	Telephone No.	8971027077
Name of PAC Chairman	~~NA~~ Dr. michael Arock		
E-mail			
Course Type	Minor Course	Telephone No.	0431- 2503736

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 OBJECTIVE(S)

- To learn the concepts web technologies; develop and deploy effective web applications
- To introduce scripting language concepts for developing client-side applications.
- To practice server-side programming features – ASP .NET, PHP, JSP.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
Students will be able to:	
1. Use linear and nonlinear data structures to solve real-time problems	PO I, II, III, IV, V
2. Apply basic searching and sorting techniques in different application domains	PO I, II, III, IV, V

COURSE PLAN – PART II

COURSE OVERVIEW

This course is aimed at offering fundamental concepts of data structures and explains how to implement them. It begins with the basic concepts of data, and data structures and then introduces the primitive and no-primitive data structures in detail. It forms the basis for understanding various ways of representing data and its usage in different computing applications.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/ Contact Hours	Topic	Mode of Delivery
1	Week 1 (3 Classes)	Introduction to Data Structures, Linear data Structures	PPT, Chalk, and Talk
2	Week 2 (3 Classes)	Linked Lists- Single, Double, Circular linked list, XOR, VList, Skip, Jump List,	PPT, Chalk, and Talk
3	Week 3 (3 Classes)	Stack: Definition and examples, Representing Stacks	PPT, Chalk, and Talk
4	Week 4 (3 Classes)	Queues: Definition and examples, priority queue, Deque	PPT, Chalk, and Talk
5	Week 5 (3 Classes)	Applications of Stack, Queue and Linked Lists- Hashing	PPT, Chalk, and Talk
6	Week 6 (3 Classes)	Binary Trees – Binary Tree Representations – node representation	PPT, Chalk, and Talk
7	Week 7 (3 Classes)	internal and external nodes, implicit array representation - Operations on binary trees	PPT, Chalk, and Talk
8	Week 8 (3 Classes)	Binary tree Traversals - Representing Lists as Binary Trees	PPT, Chalk, and Talk
9	Week 9 (3 Classes)	Graphs – Representation – Linked representation of Graphs – Graph Traversals.	PPT, Chalk, and Talk
10	Week 10 (3 Classes)	Single-source shortest path algorithms – Bellman-Ford algorithm and Dijkstra's algorithm	PPT, Chalk, and Talk
11	Week 11 (3 Classes)	Transitive closure -Topological sort	PPT, Chalk, and Talk

12	Week 12 (3 Classes)	Basic sorting techniques – selection sort, bubble sort	PPT, Chalk, and Talk
13	Week 13 (3 Classes)	insertion sort and merge sort – Basic Search Techniques	PPT, Chalk, and Talk
14	Week 14 (3 Classes)	linear search and binary search –Search Trees – Tree Searching	PPT, Chalk, and Talk

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test-1	As per the academic calendar	60 Minutes	20
2	Cycle Test 2	As per the academic calendar	60 Minutes	20
3	Assignment/Quiz	10th week	-	10
CPA	Compensation Assessment*	As per the academic calendar	60 Minutes	20
4	Final Assessment	As per the academic calendar	180 Minutes	50

*mandatory; refer to guidelines on page3

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)
➤ **At least 75% attendance in each course is mandatory.**

➤ A maximum of 10 % shall be allowed under the On Duty (OD) Category

➤ Students with **less than 65% attendance shall be prevented from writing the final assessment and be awarded a '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.

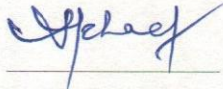➤ The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION
Students can contact the faculty to clarify their doubts in person anytime during working hours.

Compensation assessment policy:

➤ Compensation assessment will be conducted for absentees in cycle test1 or cycle test2 only after the submission of medical or On Duty certificates signed by a competent authority

FOR APPROVAL

Course Faculty _____   CC-Chairperson _____   HOD _____