DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech**		
Course Title	**Data Structures and Algorithms**		
Course Code	**EEPE 37**	**No. of Credits**	**03**
Course Code of Pre-requisite subject(s)			
Session	**July 2022**	**Section (if, applicable)**	**A**
Name of Faculty	**Dr. S. Sudha**	**Department**	**EEE**
Email	**sudha@nitt.edu**	**Telephone No.**	**9443329313**
Name of Course Coordinator(s) (if, applicable)	-------		
Course Type	☐ **Core course**	☑ **Elective course**	

Syllabus (approved in BoS)

Algorithms –Algorithmic Notation, Statements and Control Structures, Operations and Expressions, Functions, Procedures, Time and Space Analysis. Information -nature, storage and transmission of information, Primitive Data structures.

Linear Data structures and their sequential storage representation –arrays, hash, structures and array of structures, stacks, queues; their storage representation and applications. Strings –storage representation and string manipulation applications. Linear Data structures and their linked storage representation –pointers, linked allocation-single, double and circular linked list and their applications.

Nonlinear data structures –Trees, storage representation and operation on binary trees, application of trees; Graphs-representations and applications of graphs.

Sorting and searching –Selection Sort –Bubble Sort –Merge Sort –Tree Sort –Partition-Exchange Sort. Searching –Sequential Searching –Binary Searching-Search trees, Hash-Table methods.

File Structures -External Storage Devices, Record Organization, File types and their structure. Exercises covering topics of functions, arrays, stacks, queues, linked lists and trees.

COURSE OUTCOMES (COs)	Aligned Programme Outcomes (POs)					
Upon completion of this course, students will have	COs/ POs	Course outcomes (Cos)				
		1	2	3	4	5
1. Knowledge on algorithmic notations and concepts	Programme Outcomes (POs) 1	L	L	L	L	L
2. Clear understanding of the primitive data structures and their applications	2	H	M	M	H	H
3. Familiarity of linked linear and non-linear data structures and operations on such data structures	3	NA	NA	NA	NA	NA
4. The awareness of various sorting, searching algorithms and file structures	4	NA	NA	NA	NA	NA
5. The ability to design and develop menu driven application programs	5	NA	NA	NA	NA	NA
	6	H	H	H	H	H
	7	NA	NA	NA	NA	NA
	8	H	H	H	H	H
	9	M	H	H	H	H
	10	NA	H	H	M	M
	11	M	M	M	M	M
	12	M	M	M	M	M
	13	M	M	M	M	M
	14	NA	NA	NA	NA	NA

COURSE PLAN – PART II

COURSE OVERVIEW

This course on data structures and algorithms involves study of different primitive and non-primitive data types in the digital sources and algorithms to operate on these data for processing. The internal storage representation of the various data types is also dealt. The usage of these data types in certain applications through algorithms is covered. The course deals with few searching, sorting techniques and also file structures.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 10 Aug 2022 (1 contact hour)	Introduction about the course & its purpose	Chalk & talk / Tutorial/ PPT Presentation
2	Week 2 16-19 Aug 22 (2 contact hours)	Introduction to address, data & control signals, Types of memory, sequential execution, macro & micro-oerations	
3	Week 3 22-26 Aug 22 (3 contact hours)	Introduction to Data Structures and Primitive Data structures. Information -nature, storage and transmission of information.	
4	Week 4 29 Aug – 2 Sep 22 (2 contact hours)	Storage of Primitive Data structures, Introduction to Algorithm, Algorithmic Notation	

5	Week 5 5 – 9 Sep 22 (3 contact hours)	Operations and Expressions, Statements and Control Structures, Functions, Procedures.	
6	Week 6 12 - 16 Sep 22 (3 contact hours)	Space and time analysis, Analysis of algorithms. Linear Data structures and their Sequential storage representation- Arrays **Assessment - I (objective test – 15 marks)**	
7	Week 7 19 - 23 Sep 22 (3 contact hours)	Array operations and their applications. Structures, array of structures.	
8	Week 8 26 - 30 Sep 22 (3 contact hours)	Strings & its storage representation, string manipulation. Stack & its storage representation	
9	Week 9 3 – 7 Oct. 2022 (3 contact hours)	Stack applications - Recursive functions. Tutorials on stacks. Queues and their types.	
10	Week 10 10 – 14 Oct 2022 (3 contact hours)	Storage representation of queues and their applications. Different types of queues and tutorials on queues. **Assessment - II (Cycle test I – 20 marks)**	Chalk & talk / Tutorial/ PPT Presentation
11	Week 11 17 -21 Oct 2022 (3 contact hours)	Introduction to pointers. Linked allocation, Single list, their linked storage representation	
12	Week 12 24 - 28 Oct 2022 (3 contact hours)	Operations on Single lists and their applications. Double linked lists and their storage and applications. **Assessment - III (objective test – 15 marks)**	
13	Week 13 31 Oct – 4 Nov 2022 (3 contact hours)	Circular linked list, storage and their applications. Introduction to Nonlinear data structures.	
14	Week 14 7 - 11 Nov 2022 (3 contact hours)	Trees, Storage representation of trees, operation on binary trees. Application of trees. **Assessment –IV** **(Cycle test II – 20 marks)**	
15	Week 15 14 -18 Nov 2022 (3 contact hours)	Graphs representations and applications of graphs. Sorting: Selection Sort, Bubble & Merge sort.	

16	Week 16 21 -25 Nov 2022 (3 contact hours)	Tree Sort, Partition- Exchange Sort. Radix sort. Searching: Sequential searching, Binary Searching, Search trees.	
17	Week 17 28 - 30 Nov 2022 (3 contact hours)	File Structures – External Storage Devices, Record Organization, File types and their structure- More on file operations. Tutorials	
18	Week 18 1- 2 Dec 2022	**Compensation Assessment (CPA)**	
19	Week 19 14 Dec2022	**Assessment –V** **(Final semester exam – 30 marks)**	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Assessment – 1 (Ist unit & part of unit II) (Objective type)	Week 5 September 2022	30 mins	10
2.	Assessment – 2 (Units I & II) (Cycle test I)	Week 9 October 2022	90 mins	20
3.	Assessment – 3 (First half of III rd Unit) (Objective type)	Week 11 October 2022	30mins	10
4.	Assessment – 4 (Units III & IV) (Cycle test II)	Week 13 November 2022	90 mins	20
CPA	Compensation Assessment (portions of Cycle test 1 & 2)	Week 18 November 2022	90 mins	20
5.	Assessment – 5 **Final Assessment** (All units) (Written test)	Date decided by Class committee / Dean office	120 mins	40

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

Feedback from the students during class committee meetings
Anonymous feedback through questionnaire

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through their webmail.
2. Queries (if required) may be emailed to me / contact me during 3.00 pm to 4.00 pm on Friday with prior intimation for any clarifications

COMPENSATION ASSESSMENT POLICY

1. Attending all the assessments (except CPA) are MANDATORY for every student.
2. If any student is not able to attend Assessment 2 or 4 due to genuine reasons, student is permitted to attend the compensation assessment (CPA) with 20% weightage (20 marks).
3. At any case, CPA will not be considered as an improvement test.
4. There is no compensation test for the Assessment 1 & 3.
5. Relative grading will be based on the clusters (range) of the total marks (all the Assessments i.e. from 1 to 5, put together for each student) scored for grading by adopting Gap theory / Normalized curve. Letter grades, minimum pass marks and the corresponding grade points will be as per institute norms.
6. Suggestion (if any) from Class Committee / Office of the Dean (Academic) on the assessment / grading will be honored with intimation to the students.

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 On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade**

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, 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.

FOR APPROVAL

Course Faculty ________, **CC-Chairperson** ________ **HOD** ________