



**K L Deemed to be University**  
**Department of Computer Science and Engineering-Honors -- KLVZA**  
**Course Handout**  
**2022-2023, Odd Sem**

Course Title	:COMPUTATIONAL THINKING FOR STRUCTURED DESIGN
Course Code	:22SC1101
L-T-P-S Structure	: 3-0-2-6
Pre-requisite	:
Credits	: 5.5
Course Coordinator	:SREERAM NIMMAGADDA
Team of Instructors	:
Teaching Associates	:

**Syllabus :**Structured Programming Paradigm: Problem Solving Approach, Algorithms and Algorithm Analysis, Program Development Steps, Structure of C Program, Pre-Processor Directives, Design of Building Blocks for solving real world problems: Modularization: Functions, Scope of Variables and Storage classes, Data Types: Primitive, Extended and Derived Including Pointers, Operators: Types of operators, Precedence, Associativity, User I/O: Formatted I/O, Command line arguments, Redirecting I/O: Files and File Operations. Logic Design for Computational Thinking: Control Flow Statements: Decision Making using conditional statements, Definite and indefinite Iterative statements. Recursion, logic building using complex building blocks. CRUD operations on Basic Data Structures: Basic Data Structure: Arrays, 2-D Arrays, Dynamic Memory Allocation Searching: Linear Search and Binary Search Sorting: Bubble Sort CRUD operations on Linear Data Structures: Stacks, Queues and Single Linked List. Introduction to Trees.

**Text Books :**1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language: ANSI C Version", 2/e, Prentice-Hall/Pearson Education-2005. 2. E. Balagurusamy, "Programming in ANSI C" 4thed., Tata McGraw-Hill Education, 2008. 3. R. F. Gilberg, B. A. Forouzan, "Data Structures", 2nd Edition, Thomson India Edition-2005.

**Reference Books :**1. Mark Allen weiss, Data Structures and Algorithm Analysis in C, 2008, Third Edition, Pearson Education. 2. Horowitz, Sahni, Anderson Freed, "Fundamentals of Data structures in C", 2nd Edition-2007. 3. Robert Kruse, C. L. Tondo, Bruce Leung, Shashi Mogalla, "Data structures and Program Design in C", 4th Edition-2007. 4. C for Engineers and Scientists – An Interpretive Approach by Harry H. Cheng, Mc Graw Hill International Edition-2010. 5. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", 7/e, Pearson Education-2004. 6. Jean Paul Tremblay Paul G.Sorenson, "An Introduction to Data Structures with applications", 2nd Edition.

**Web Links :**1. [www.hackerrank.com](http://www.hackerrank.com) 2. [www.codechef.com](http://www.codechef.com) 3. [www.spoj.com](http://www.spoj.com) 4. <https://leetcode.com/> 5. <https://codeforces.com/>

**Course Rationale :**The course takes an imperative view of problem solving through programming using C programming language. This necessitates data abstraction, basics of data structures, and an introduction to the GNU/Linux operating system and programming the medium level language C. Student is professionally trained in algorithms, flowcharts, analysis of a problem and translating the same into a C program. The students are made to write C programs on their own for sets of both mathematical and other engineering problems after exposing them to the different constructs of C language namely Input/output, assignments, iteration, and control structures. Finally, the student is acquainted with basic data structures like stacks, queues, lists etc.

**Course Objectives :**The objective of the course is to equip the student with Design &problem-solving skills using C Language and associated Data Structures to provide the student details about algorithms used in

typically familiar problems, and a few details about the essential ingredients of the programming language C and fundamental Data Structures

#### COURSE OUTCOMES (COs):

CO NO	Course Outcome (CO)	PO/PSO	Blooms Taxonomy Level (BTL)
CO1	Develop and apply logical building blocks to solve real world problems	PO1,PO2	3
CO2	Apply computational thinking for designing solutions	PO2,PO1	3
CO3	Develop and apply the CRUD operations on arrays	PO1,PO2	3
CO4	Apply CRUD operations on Linear Data Structures	PO4	3
CO5	Apply the structured programming paradigm with logic building skills on Basic and Linear Data Structures for solving real world problems	PO1,PO2,PO4	3
CO6	Skill the students in such a way that students will be able to develop logic that help them to create programs as well as applications in C	PO2,PO4,PO1	3

#### COURSE OUTCOME INDICATORS (COIs)::

Outcome No.	Highest BTL	COI-1	COI-2	COI-3	COI-4
CO1	3	<b>Btl-1</b> Describe problem solving techniques and translate algorithm/ flowchart to a C program	<b>Btl-2</b> Write programs using Complex Building blocks with different modes of user Input	<b>Btl-3</b> Design modularized code with Decision making constructs in solving computational problems.	
CO2	3	<b>Btl-1</b> Syntactically differentiate definite and indefinite iterative statements	<b>Btl-2</b> Convert among definite and indefinite iterative statements and able to write alternate logic for a given problem. convert recursive functions to iterative statements.	<b>Btl-3</b> Design iterative and recursive logic to solve real world problems	
CO3	3		<b>Btl-2</b> Write syntactically accurate code for 1-D and 2-D Arrays, demonstrates dynamic memory allocation	<b>Btl-3</b> Apply DMA to Solve real world problems and perform CRUD operations on multi-dimensional Arrays	<b>Btl-3</b> Apply CRUD operations on multi-dimensional arrays using asymptotic notations in solving real world problems.
CO4	3		<b>Btl-1</b>	<b>Btl-3</b>	<b>Btl-3</b>

			Write syntactically accurate code for Implementing stacks, queues and SLL (with structure pointers)	Apply CRUD operations on stacks, queues, and SLL	Apply CRUD operations on Linear Data Structures using asymptotic notations.
CO5	3	<b>Btl-3</b> Apply structured programming paradigm with logical building skills on basic and linear data structures for solving real world problems			
CO6	3	<b>Btl-3</b> Skill the students in such a way that students will be able to develop logic that help them to create programs as well as applications in C			

#### PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES (POs/PSOs)

Po No.	Program Outcome
PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences
PO3	Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline.
PO5	Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

PO9	Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.
PSO1	An ability to design and develop software projects as well as Analyze and test user requirements.
PSO2	An Ability to gain working Knowledge on emerging software tools and technologies.

**Lecture Course DELIVERY Plan:**

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
1	CO1	COI-1	Structured Programming Paradigm	TB-1	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM- EXAM1,Skill Sem-End Exam,Skilling Continuous Evaluation
2	CO1	COI-1	Designing Algorithms for problem solving	TB-1	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM- EXAM1,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
3	CO1	COI-1	Designing flowcharts for problem solving	TB-1/Ch:2/9	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
4	CO1	COI-2	Data types: int, int pointer, float, float pointer, char, char pointer	T1-PP.1-46	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
5	CO2	COI-1	Data types: int array, float array, char array	TB-1/PP:1-46	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,SEM-EXAM1
6	CO1	COI-2	Basic Operators: Arithmetic, Relational, Logical	TB-1/PP:1-46	Chalk,LTC,PPT,Talk	ALM,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
7	CO1	COI-2	Modularization- functions	TB-1/PP:1-9	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,SEM-EXAM1

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
8	CO1	COI- 2	Storage classes	TB-1/PP-60	Chalk,PPT,Talk	ALM,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
9	CO1	COI- 3	User input from console	TB-1/PP-5	Chalk,PPT,Talk	ALM,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1
10	CO1	COI- 3	User Input from files	TB-1/PP-27-38	Chalk,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
11	CO1	COI- 3	if-else, else if ladder, conditional operator	TB-1/PG:55	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation
12	CO1	COI- 3	Nested if-else, switch	TB-1/PG:57	Chalk,LTC,PPT,Talk	ALM,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
13	CO2	COI-1	Increment, decrement Operators	TB-1/PG:46	Chalk,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,SEM-EXAM1,Skill In-Sem Exam
14	CO2	COI-1	Iterative statements - for, while, do-while	TB-1/PG:60-63	Chalk,PPT,Talk	ALM,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skill In-Sem Exam,Skilling Continuous Evaluation
15	CO2	COI-1	Loops	TB-1.PG:60-63	Chalk,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,SEM-EXAM1
16	CO2	COI-1	Nested Loops	TB-1/PG:60-63	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,SEM-EXAM1,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation
17	CO2	COI-2	Bitwise Operators-I	TB-1/PG:43	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
18	CO2	COI-2	Bitwise Operators-II	TB-1/PG:43	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,SEM-EXAM1
19	CO2	COI-2	Expression Evaluation Rules, Operator Precedency	TB-1/PG:28	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM1,Skilling Continuous Evaluation
20	CO2	COI-3	Recursion	PG:86	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,Home Assignment,Lab In Semester Exam,SEM-EXAM1
21	CO2	COI-3	Problem solving using recursion	TB-1/PG:86	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,LCE,SEM-EXAM1,Skilling Continuous Evaluation
22	CO3	COI-2	Data types: char pointer, command line arguments	PG:76	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,LCE,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
23	CO3	COI- 2	Strings and String library	PG:76	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,LIT,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
24	CO3	COI- 2	1D Arrays – creation and insertion	pg-56	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
25	CO3	COI- 2	Bubble sort	pg-65	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
26	CO3	COI- 2	Linear Search	pg:67	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
27	CO3	COI-2	Binary search	pg:78	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,Skilling Continuous Evaluation
28	CO3	COI-3	Dynamic Memory Allocation	pg:76	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,SEM-EXAM2
29	CO4	COI-3	2-D Arrays – creation and insertion	pg:79	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,SEM-EXAM2
30	CO3	COI-3	2-D Arrays, Matrix creation and insertion	pg:78	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,SEM-EXAM2
31	CO3	COI-4	Matrix Algebra	pg	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,SEM-EXAM2
32	CO4	COI-2	Structures	pg-88	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
33	CO4	COI-2	Array of Structures	pg-88	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,SEM-EXAM2

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
34	CO4	COI-2	Structure Pointer	pg-90	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
35	CO4	COI-3	Linear Data Structures Stacks using arrays	TB-2 pg 145	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,Home Assignment,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
36	CO4	COI-3	Linear Data Structures Stacks using arrays	TB-2 PG:148	Chalk,LTC,PPT,Talk	ALM,Home Assignment,Lab End Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
37	CO4	COI-3	Linear Data Structures Queue using arrays	TB-2/PG-156	Chalk,LTC,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
38	CO4	COI-3	Linear Data Structures Single Linked List - using structures	tb-2pg:176	Chalk,LTC,PPT,Talk	ALM,Home Assignment,Lab In Semester Exam,SEM-EXAM2,Skill In-Sem Exam,Skill Sem-End Exam,Skilling Continuous Evaluation

Sess.No.	CO	COI	Topic	Book No[CH No] [Page No]	Teaching-Learning Methods	Evaluation Components
39	CO4	COI-3	Delete operation on linked list	TB-2	Chalk,LTC,PPT,Talk	ALM,End Semester Exam,Home Assignment,Lab End Semester Exam,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation
40	CO4	COI-4	Introduction to nonlinear data structures	TB-2	Chalk,PPT,Talk	ALM,Continuous Evaluation - Lab Exercise,End Semester Exam,Home Assignment,Lab In Semester Exam,Ratings on Global Platforms,SEM-EXAM2,Skilling Continuous Evaluation

### Lecture Session wise Teaching – Learning Plan

**SESSION NUMBER : 1**

**Session Outcome:** 1 Understand concept of structured programming

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
5	Attendance	1	Talk	--- NOT APPLICABLE ---
20	Explain structured Programming	2	Talk	--- NOT APPLICABLE ---
20	Need of structured Programming	2	Chalk	--- NOT APPLICABLE ---
5	conclusion	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 2**

**Session Outcome:** 1 Design modularized solutions using algorithmic constructs to solve computational problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
20	Sub-task-1(Lecture): Introduction to Problem Solving through Algorithms and Flow charts • Introduction to Algorithms • Understanding how to write Algorithms For different categories of problems Sequence and selection. • Design algorithms for the following 1. Write an algorithm to calculate area of a circle. 2. Write an algorithm to print first 'n' natural numbers. 3. Write an algorithm and draw a flowchart to print greatest of two numbers	2	Chalk	--- NOT APPLICABLE ---
20	Practice session: 1. Write an algorithm to calculate simple interest. 2. Write an algorithm to check if the year is leap year or not. 3. Write an algorithm to find if the number is positive or negative	2	Talk	--- NOT APPLICABLE ---
10	Conclusion on algorithms	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 3**

**Session Outcome:** 1 Design flow charts to solve real life computational problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Introduction to Problem Solving through Flow charts • Introduction to Flowcharts and symbols • Understanding how to draw flow charts for different categories of problems Sequence and selection. • Drawing flow charts for algorithms 1. Write an algorithm to calculate area of a circle. 2. Write an algorithm to print first 'n' natural numbers. 3. Write an algorithm and draw a flowchart to print greatest of two numbers Practice session: 1. Write an algorithm and draw a flow chart to calculate simple interest. 2. Write an algorithm and draw a flow chart to check if the year is leap year or not. 3. Write an algorithm and draw a flow chart to find if the number is positive or negative.	1	Chalk	Leading question

**SESSION NUMBER : 4**

**Session Outcome:** 1 Understand Basic Data Types and to create variable of int, float and char data

**Session Outcome:** 2 Understand the concept and use of pointers of int and float and char data type

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Introduction to Data Types in C. Define Integer data type, and Pointers to int. Define Float Data Type, Pointers to float. Define char data type, pointer to char 1. Write a C Program to create an integer variable to	2	Chalk	Leading question

<p>store Employ ID and a float variable to store Employee salary and print those values. (Taking input from user). Sub-task-1(Lecture): Introduction to Data Types in C. Define Integer data type, and Pointers to int. Define Float Data Type, Pointers to float. Define char data type, pointer to char 1. Write a C Program to create an integer variable to store Employ ID and a float variable to store Employee salary and print those values. (Taking input from user). Practice session: . 1. Write a C Program to create two integers' variables with values 10 and 20 respectively and print their sum using integer pointer. 2. Write a C Program to create two integer variables with values 10 and 20 respectively and swap these integer values. 3. Write a C program to create an array with 5 float elements in a float array, find sum and average using float pointer</p>			
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## SESSION NUMBER : 5

**Session Outcome:** 1 Understand the concept and use of int, float and char arrays

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
5	Attendance	1	Talk	--- NOT APPLICABLE ---
10	Quiz	2	LTC	Quiz/Test Questions
35	Sub-task-1(Lecture): Introduction to arrays Define Integer array Define Float array. Define char array Practice session: . 1. Write a C Program to store CGPA of 10 Students in a float array. Ask them to print these values 2. Write a C program to create an array with 5 float elements in a float array, find sum and average using float pointer	2	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 6

**Session Outcome:** 1 Use arithmetic, relational, and logical operators

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Explanation of arithmetic and relational operators with the following problems 1. A computer programming contest requires teams of 5 members each. Write a program that asks for the number of players and then give the number of teams and number of players leftover? 2. Ask the students to write either algorithm or program to find given number is positive or negative or zero number. Explanation of logical operators with the following problems 1. Develop a routine in C that checks the given coordinates point(X,Y) and determine to which quadrant the coordinate point lies in. 2. An Immigration checking employee in airport	2	Talk	--- NOT APPLICABLE ---

performs the following basic checks in permitting passengers to waiting hall. (a) Valid passport Id (Ex. 1000 – 5000 ) and (b) Age  $\geq 5$ . The passenger is permitted only if both the checks are satisfied. Implement a module in C to perform the above checks.

## SESSION NUMBER : 7

**Session Outcome: 1** Know the benefits of function in computer programming

**Session Outcome: 2** Apply structured programming concepts in solving problems

**Session Outcome: 3** Solve computer applications with modular concepts

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub task-1(Lecture): What is a function, necessity of function, function declaration, definition, function prototype in C. We will ask students to practice the Practice session-1 Write a function to calculate value of $(a+b)^2$ where a and b are two integers. Practice session-2: Write a function that takes one character as input and prints out that character plus the next 5 characters , separated by tabs. The function takes one char argument, and returns a char. For example, if the value of the argument passed to the function was ‘m’, then the function would print : m n o p q r and return ‘r’. show separately the function declaration , the function definition and function invocation.	3	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 8

**Session Outcome: 1** Think in logical way to solve real-time applications using storage classes

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation for usage of storage classes and types (auto and static with examples. Predict the output. #include void func(void); int main() { func(); func(); return 0; } void func( ) { static int i = 5; int j=5; i=i+1; j=j+1; printf("i is %d and j is %d\n", i, j); } Practice session: 1. Program to perform addition of two numbers using auto keyword. 2. Write a C program with function name sample() with no argument and no return type. sample() function contains auto integer variable ‘a’ and static integer variable ‘b’ with value assigned to 0. print the value of ‘a’ and ‘b’ and then increment the value of ‘a’ and ‘b’ by 1 where the main() method calls the sample() function thrice. 3. Predict the output. #include int nextEven(); void main() { int x=nextEven(); printf("x is %d \n", x); x=nextEven(); printf("x is %d \n", x); } int nextEven() { static int a; a=a+2; return a; }	3	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 9**

**Session Outcome:** 1 Understand the concept of reading user inputs using Console- Formatted Input

**Session Outcome:** 2 Develop interactive solutions for real world problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation about User Input through Console- Formatted Input-scanf(). Practice session: 1. Pradeep's basic salary is input through keyboard. His dearness allowance is 40% of his basic salary and House Rental Allowance is 20% of his basic salary. Write a program to calculate his Gross salary. 2. Write a C function that accepts the following details of a Petrol Consumer from console and print the same. Petrol details are the quantity, the price per litre, the percentage discount.	3	Talk	Leading question

**SESSION NUMBER : 10**

**Session Outcome:** 1 1. Develop interactive solutions using files for real world problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation about File- Explanation of use of files, different file operations(r,w,a+,w+), fopen(),fclose(),fscanf(),fprintf() Using File concepts, perform a simple addition by storing the data into the file and retrieving it. Practice session: 1. There are two numbers x and y in original.txt. Read these values from file.txt and store the values of x and y in duplicate.txt. Write a C routine to complete the task. 2. Develop a file application to write ID number and Salary of an employee into the file and display the employee data on the console.	3	Talk	Leading question

**SESSION NUMBER : 11**

**Session Outcome:** 1 Understand the usage of conditional operator

**Session Outcome:** 2 Develop solutions using conditional statements

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Ask the student to write an algorithm to illustrate the following. Indian Cricket Team went to toss with its opposite team captain. If India wins the toss display "India selected to bat" otherwise display "India selected to Field" as the message. Use the above problem to explain the syntax and execution flow of simple if and if-else statements Explain else if ladder with the help of following	3	Talk	--- NOT APPLICABLE ---

problems 1. To check given input character is vowel or consonant. 2. Write a program to find whether the number can be divisible by both 5 and 3 or not. Explain Conditional operator with the following problem: Write a C program to find biggest of two numbers using conditional operator.

## SESSION NUMBER : 12

**Session Outcome:** 1 Write solutions using multi conditional statements

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Explanation of nested if else with above problem Write a program to find biggest of three numbers Explanation of switch statement Raja went to Trendset mall on x vehicle to buy dresses for his family. He parked the vehicle in malls paid parking area and completed shopping. After he returns he has to pay for the parking. Now you have to calculate the parking charges for the vehicle. Enter the type of the vehicle as a character(c for car, b for bike, a for auto).you have to read the hours and minutes when the vehicle enters the parking slot and when it is leaving. Write a C program to Calculate the total parking fees. The Trendset mall has fixed the rates as shown below.(Using nested if else)</p> <p>Vehicle name Rate till 3 hours Rate after 3 hours</p> <p>Truck/Auto 20 30 Car 10 20 Motorcycle/Scooter 5 10</p>	3	Chalk	--- NOT APPLICABLE ---

## SESSION NUMBER : 13

**Session Outcome:** 1 Apply increment and decrement operators to solve problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Sub-task-1(Lecture): Introduction to Increment and Decrement operators</p> <p>1) What will be the result after executing the program? main() { int a=10; printf("%d",a++); printf("%d",++a); printf("%d",a); printf("%d",a--); printf("%d",--a); printf("%d", Practice Session : 1) What will be the result after executing the program? main() { int a=10,b=11,c=12,d=13,e; e=a++ + --b - ++c + d--; printf("%d",e); } 2) Predict the output for the following program. main() { int a=5; int b= ++a + ++a + ++a; printf("%d %d",b,a); } 3) What will be the result after executing the program? main() { int a=5; print("%d%d%d", ++a , a , a++); }</p>	2	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 14

**Session Outcome:** 1 Develop iterative solutions to solve real world problems

Time(min)	Topic	BTL	Teaching-	Active

			Learning Methods	Learning Methods
50	<p>Introduction of iterative statements (for, while, do-while)</p> <p>Explanation of While and for loops syntax and flow chart 1.</p> <p>Write a program to print numbers from 1 to n using while loop and for loop 2. Give a task to students to print first n even numbers using while loop and for loop 1. Write a C program to enter any number and calculate sum of its digits</p> <p>2. Write a program to print multiplication table up to N multiples</p> <p>3. Write a program to print Fibonacci sequence up to N terms Compare while loop with for loop</p>	2	Talk	Leading question

## SESSION NUMBER : 15

**Session Outcome:** 1 Differentiate while and do-while structures

**Session Outcome:** 2 Write solutions using do-while loop

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Sub-task1(Lecture): Explain the syntax of do-while loop. Explain flowchart for do-while loop. Differentiate while and do-while loops.</p> <p>1. Write a program to print all accepted integer numbers each in a new line, until user enters zero using do-while construct</p> <p>2. Write a program to print all the even numbers in the given range using do-while Practice session:</p> <p>1. Write a C program to demonstrate do-while for following scenario: The loop needs to have a counter starting at zero that increments every time the loop is executed. Inside the loop there needs to be a variable (say x), which is initially set at 1, that doubles each time the loop is executed. The loop needs to continue until the doubling variable exceeds given integer (say n). Once the loop terminates, then return the counter. Print x values.</p> <p>Sample input: Enter a number (for n):50 Sample output: 2 4 8 16 32</p> <p>2. Create an equivalent of four function calculators. The program should request the user to enter two numbers and an operator. It should carry out specified arithmetic operation on the two numbers (use switch case). After displaying the result, the program should ask the user if he/she wants to do another calculation. If 'y', make it perform another operation. Sample input: + 5 6 Do you want to continue(y/n):n Sample output: Addition performed:11</p> <p>3. Read a positive integer value, and compute the following sequence: If the number is even, halve it; if it's odd, multiply by 3 and add 1. Repeat this process until the value is 1, printing out each value. Sample output:</p> <p>Initial value of n: 9 Next value is 28 Next value is 14 Next value is 7 Next value is 22 Next value is 11 Next value is 34 Next value is 17 Next value is 52 Next value is 26 Next value is 13 Next value is 40 Next value is 20 Next value is 10 Next value is 5 Next value is 16 Next value is 8 Next value is 4 Next value is 2 Final value 1</p>	2	Talk	Leading question

**SESSION NUMBER : 16****Session Outcome:** 1 Write solutions using nested loops

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
20	Quiz	2	LTC	Quiz/Test Questions
30	Explanation of nested loops 1. Write a program to print following pattern. 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 2. Write a program to print prime numbers up to n 3. Write a program to print following pattern A B C D E F G H I J Conclusion on loops	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 17****Session Outcome:** 1 Use bitwise operators

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Explain Bitwise operators Bitwise AND(&) Bitwise OR( ) Bitwise Not(~) Ask the students to practice the following problems 1. Void main() { int a=12,b=25; printf("a&b=%d",a&b); printf("a b=%d",a b); printf("~a=%d",~a); printf("~b=%d",~b); } 2. Write a C Program to simulate AND, OR and NOT logic gates by allowing the user input binary values for A and B	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 18****Session Outcome:** 1 Use bitwise operators

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Explain Bitwise operators Bitwise XOR (^) Bitwise Left shift (<<) Bitwise Right shift (>>) 1. Swap two values by using XOR operators. 2. Ask student to solve the following problem: Void main() { int a=212,b,c; b=a<<2; c=a>>3; printf("b=%d,c=%d",b,c); } 3. Ask the student how to double and half the values by using bitwise left shift and right shift operators conclusion	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 19****Session Outcome:** 1 understand the precedence and associativity of C operators

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods

50	Evaluate the following expression using BODMAS rule. $7 + \frac{8(3)}{12} - 30 \div 6$ . Explain operator precedence and associativity 1. find o/p of following: void main() { Int a,b=3; char c='a'; a=b+c; printf("%d\n",a); } 2. Write a C Program to find out Reynold Number, Prandtl No., Heat Transfer Coefficients, Catalyst Surface temperature. 3. Write a C Program for "Newton Raphson" method (To find out the root of the equation).	3	Talk	--- NOT APPLICABLE ---
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**SESSION NUMBER : 20**

**Session Outcome:** 1 Implement concept of recursion to solve real world problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Explain what a recursion is & how recursive functions work? 1. Write a C program to find nth term in Fibonacci Series using Recursion. 2. Write a program to print the sum of natural numbers using recursion conclusion	3	Talk	Leading question

**SESSION NUMBER : 21**

**Session Outcome:** 1 Apply concepts of recursion and iterations to solve problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explain about difference between iterative and recursive solution. Explain Iterative solutions to recursive solutions. 1. Write a program to find the factorial of a given number using recursion 2. Ask the student to write the program to displays integers 100 through 1 using Recursion and Iteration Practice Session: 1. Ask the student to write the implementation of finding factorial of number using recursion as well as iteration 2. Write a C program to count digits of a number using Recursion and Iteration. 3. Write a C program to find sum of all digits using Recursion and Iteration. 4. Ask the student to Calculate power of a number program using Recursion and Iteration 5. <a href="https://www.includehelp.com/c-programs/length-of-string-recursion.aspx">https://www.includehelp.com/c-programs/length-of-string-recursion.aspx</a> Ask the student to write C program to calculate length of the string using Recursion and Iteration	3	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 22**

**Session Outcome:** 1 To Build problems on char data type, char array, char pointer

**Session Outcome:** 2 use command line arguments

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods

50	Explanation of char data type, char array, char pointer Develop a function that takes character as an argument and displays the keyed-in character along with previous and next characters as per ASCII values. Explain about command line arguments Practice Session: 1. Develop a program which initializes character array with set of n characters and display the sum of all characters as per their ASCII values. 2. Develop a program which initializes character array with set of characters and create a character pointer and display the second and third character of character array using character pointer. 3. Write a C program which read 3 numbers through command line arguments and print the sum of three numbers.	2	Talk	--- NOT APPLICABLE ---
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**SESSION NUMBER : 23****Session Outcome:** 1 Apply string library function

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation of String and Library functions (strlen(), strcmp(), strcat(), strcpy(), strcmp()etc..) with the help of following problem Develop a program to read two strings which can perform following operations • Finding the string length • Comparing two strings • Appending second string to first string • Reverse the string • Palindrome 25 Practice session: 1)Write a program to read a string and find out a word is present in that string and also print starting index of the word using strstr(). Input: Str1="Was this the face that launch'd a thousand ships"; Str2="face"; Output: String 'face' was found at position 14 in string 'Was this the face that launch'd a thousand ships'. 2)Write a program to declare to three strings and take input into two strings and concatenate two strings into the third string in one line of code Input: Str1:The face of the ship Str2:is too wide Str3:Empty(It should contain the concatenated string) Output: Str3 should print "The face of the ship is too wide" 3)Wrtite a program to compare two different strings upto nth character(Hint: strncmp(str1, str2,BUFFERSIXE))	3	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 24****Session Outcome:** 1 Understand and implement 1D arrays

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Read 100 numbers, compute their average, and determine how many numbers are above the average. Explain need of arrays, array definition and declaration. Input/output statements and how to use it in	2	Talk	--- NOT APPLICABLE ---

coding. Practice session: 1. A competition is conducted in two different galleries of the venue. Just for the ease of their management, the Event organizers have announced to divide the children into two groups, to attend the competition in the two chosen galleries. By that note, all those children who have their registration code as an even number will be put in one gallery and those with odd number will be in another gallery. Help the organizers to find count of number of even registration codes and odd registration codes from the total N. Note: The registration code need not be unique as each child will have a unique school code. Input Format: The first line of input consists of a single integer N denoting the number of registration codes issued for the competition. The second line of input consists of N space separated integers, denoting the registration codes of each child. Output Format: Output a single with the count of even numbers and odd numbers from N, separated by a single space. Refer sample input and output for formatting specifications. Sample Input 1: 3 1 4 10  
 Sample Output 1: 2 1 Sample Input 2: 5 2 6 23 12 11  
 Sample Output 2: 3 2 Reference: [www.codevita.com](http://www.codevita.com) 2.  
 Given a non-empty array, return true if there is a place to split the array so that the sum of the numbers on one side is equal to the sum of the numbers on the other side.  
`canBalance([1, 1, 1, 2, 1]) → true`  
`canBalance([2, 1, 1, 2, 1]) → false`  
`canBalance([10, 10]) → true` Reference:  
<https://codingbat.com/prob/p158767>

## SESSION NUMBER : 25

**Session Outcome:** 1 Apply Bubble sort to sort array elements.

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Sub-task-1(Lecture): In a sports class student are lined up in a random order. Now you're given a task of lining up all the students in an ascending order of height. Explanation of Bubble Sort passes</p> <p>Practice session: 1. Write a program to arrange the list of marks in descending order and print highest student marks 2. int bubblesort(int a[10],int n) { count=0; int swap=1,i;    while(swap!=0) { swap=0; count=count+1; for(i=1;i&lt;=n-1;i++) { if(a[i]&gt;a[i+1]) { int temp=a[i]; a[i]=a[i+1]; a[i+1]=temp; swap=1; } } return count; } For the given inputs n=5 and array elements a[5]={1,3,2,5,4}, what the above function will return.</p> <p>3. A new deadly virus has infected large population of a planet. A brilliant scientist has discovered a new strain of virus which can cure this disease. Vaccine produced from this virus has various strength depending on midichlorians count. A person is cured only if midichlorians count in vaccine batch is more than midichlorians count of person. A doctor receives a new set of report which contains midichlorians count of each infected patient, Practo stores all vaccine doctor has and their midichlorians count. You need to determine if doctor can save all</p>	3	Talk	--- NOT APPLICABLE ---

patients with the vaccines he has. The number of vaccines and patients are equal. Input Format: First line contains the number of vaccines - N. Second line contains N integers, which are strength of vaccines. Third line contains N integers, which are midichlorians count of patients. Output Format: Print a single line containing 'Yes' or 'No'. 5 123 146 454 542 456 100 328 248 689 200 Output: NO Ref: <https://www.hackerearth.com/practice/algorithms/sorting/bubble-sort/practice-problems/algorithm/save-patients/>

## SESSION NUMBER : 26

**Session Outcome:** 1 Apply linear search operation on array

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task 1(Lecture): Suppose you use Uber application as a ride and you request a ride to go from one place to another. Your driver just arrived at the parking lot of your place. The only thing you know about the ride is the license plate number. How do you find your Uber ride? Explanation on Searching an element in a array by using Linear Search and its Time Complexity. 1. You have been given an array of size N consisting of integers. In addition, you have been given an element M you need to find and print the index of the last occurrence of this element M in the array if it exists in it, otherwise print -1. 2. The couples and singles are participating in a TV show. Write a program to help the TV show manger to identify the count of couples participated in the show. Assume the couples are given with same identity number. 3. Given A Series Of N Positive Integers a1,a2,a3.....an. , Find The Minimum And Maximum Values That Can Be Calculated By Summing Exactly N-1 Of The N Integers. Then Print the respective Minimum and Maximum Values As A Single Line Of Two Space-Separated Long Integers.	3	Talk	Leading question

## SESSION NUMBER : 27

**Session Outcome:** 1 Apply binary search operation on array

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): we have a book which has 42949672960 pages. We also have a table of contents. Now we want to read the content on page 104000. How do we do that? Explain Divide and Conquer Concept. Introduction to Binary Search, Binary Search algorithm with recursive and with Iterative and its time complexity. Practice session: 1. Write a C Program to read N integers in an array and search key element. Print the position of searching element if found,	3	Talk	--- NOT APPLICABLE ---

print “Element Not Found” otherwise. 2. Monk and his friend Micro are on a quest to find the answer of Life, Universe and Everything. In order to complete it they need to answer Q queries on an array A having N integers. The queries can be of following two types: 0 x: Find the number of numbers in A which are not less than x. 1 x: Find the number of numbers in A which are greater than x. Help them complete the quest and be back in time for the next Code Monk Challenge. Input First line consists of a single integer denoting N. Second line consists of N space separated integers denoting the array A. Third line consists of a single integer denoting Q. Each of the following Q lines consists of a query of one of the given two types. 4 1 2 3 4 3 0 5 1 3 0 3 Output 0 1 2 Ref: <https://www.hackerearth.com/problem/algorithm/monk-and-search-2-cff3fa01/> 3. Cool boy goes to buy soap from a shop. The shop contains N soaps. The prices of soap are given in the form of an array A. The price of ith soap is A[i]. Now cool boy has q queries, in each query he wants to know the number of soaps that have price less than the given amount M. Input: First line contains integer N total number of soaps available in the shop. Second line contains N space separated integers. Third line contains Q number of queries. Each of the next Q lines contain integer M. 5 1 4 10 5 6 4 2 3 5 11 Output: 1 1 2 5

## SESSION NUMBER : 28

**Session Outcome:** 1 Implementing and solving problems through DMA operations

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
20	Quiz	2	LTC	Quiz/Test Questions
30	Sub-task-1(Lecture): Identify error in the following statement? int a[5]; a[7]=15; Explanation of Dynamic Memory Allocation and its functions malloc(),calloc(),realloc(),free() Practice session: 1. Given an int array, return a new array with double the length where its last element is the same as the original array, and all the other elements are 0. makeLast([4, 5, 6]) → [0, 0, 0, 0, 0, 6] makeLast([1, 2]) → [0, 0, 0, 2] makeLast([3]) → [0, 3] Ref: www.codeingbat.com 2. Write a program that reads 10 numbers and displays distinct numbers (i.e., if a number appears multiple times, it is displayed only once). (Hint: Read a number and store it to an array if it is new. If the number is already in the array, discard it.	2	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 29

**Session Outcome:** 1 Implement 2Dimensional Arrays and Multidimensional arrays

Time(min)	Topic	BTL	Teaching-	Active
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			Learning Methods	Learning Methods
50	<p>Sub-task-1(Lecture): Read 4 subject marks of five students and calculate highest mark in each subject. Explain 2D array (Multidimensional array) with syntax, memory layout and initialization in different ways with suitable examples.</p> <p>Practice session: 1. The world contains 10 countries each country is suffering with 3 different types of viruses (corona, Ebola, swine flu) Write a program to print a) The total no of persons infected in each country. b) The total no of infected persons of each virus. (Medium) 2. In a small college there are 5 faculty. Each faculty is supposed to teach three different subjects like C, C++, JAVA. The college management collected feedback from students. Of all 5 faculty from 3 different subjects. Write a C program to print a. The total count of faculty who got more than average feedback in JAVA subject. b. Print the 2 highest feedbacks among all the subjects of all the faculty. (Medium) Problem Discussion</p>	3	Talk	Leading question

**SESSION NUMBER : 30****Session Outcome:** 1 Write programs with 2D arrays

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Explanation of 2D Array and its syntax with following example A and B are two m x n matrices. Find the third matrix C= A+B. write algorithm for matrix addition.</p> <p>Practice problem: The world contains 10 countries each country is suffering with 3 different types of viruses (corona, Ebola, swine flu) Write a program to print a) The total no of persons infected in each country. b) The total no of infected persons of each virus.</p>	3	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 31****Session Outcome:** 1 Implement addition, subtraction, and multiplication operations on 2D Matrices

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Practice Session: 1. Write a program that contains 0's and 1's into a 4-by-4 square matrix, prints the matrix, and finds the rows, columns, and diagonals with all 0s or 1s. Here is a sample run of the program: 0111 0000 0100 1111 All 0's on row 1 All 1's on row 3 2. You are given a two-dimensional 3*3 array starting from A [0][0]. You should add the alternate elements of the array and print its sum. It should print two different numbers the first being sum of A[0][0], A[0][2], A[1][1], A[2][0], A[2][2] and A[0][1], A[1][0], A[1][2], A[2][1]. Input Format: First and only line contains the value of array</p>	3	Talk	Quiz/Test Questions

separated by single space. Output Format: First line should print sum of A 0 0, A 0 2, A 1 1, A 2 0, A 2 2 Second line should print sum of A 0 1, A 1 0, A 1 2, A 2 1 SAMPLE INPUT: 1 2 3 4 5 6 7 8 9 SAMPLE OUTPUT: 25 20 Ref: <https://www.hackerearth.com/practice/data-structures/arrays/multi-dimensional/practice-problems/algorithm/add-alternate-elements-of-2-dimensional-array/> Enter a number between 0 and 511: 7 0 0 0 0 0 1 1 1 Ref: Textbook , “programming in c “ by Dinel Lingue 3. An n \* n matrix is called a positive Markov matrix, if each element is positive and the sum of the elements in each column is 1. Write a program to check whether a matrix is a Markov matrix:

## SESSION NUMBER : 32

**Session Outcome: 1** Illustrate the usage of Structures

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation of structures and discuss the implementation of user defined data-type ‘struct’. Study the information displayed on ID card and analyzes their types of data values. Now discuss how to store the above information into a record format. Practice session: 1. Identify the storage details of account holders of specified Bank branch, Vijayawada. 2. Define a structure for Book Specifications like title, author, subject and cost. Read the details from console then display the details.	3	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 33

**Session Outcome: 1** Solve real world problems using structure arra

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation of array of structures (how to declare, how to initialize, how to access elements) Define a structure Bank with members Name,AccountNo,Branch,BranchCode, Balance and read 2 records and display them using structure array Practice session: 1. Define a Structure Student with Name, Age, Marks, ID using appropriate Data Type and Size as Members. Implement function to store 2 student records and read records and display those details. 2. Define a Structure Employee with ename,eid,Salary using appropriate Data Type and Size as Members and read 2 employee records and display the record of an employee whose salary is 60000. 3. Define a Structure Student with Name, Age, Marks, ID using appropriate Data Type and Size as Members. Implement	3	Talk	Leading question

	function to store 2 student records and read records and display the record of student whose age is greater than 20.			
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## SESSION NUMBER : 34

**Session Outcome:** 1 Solve real world problems using Structure pointers

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task-1(Lecture): Explanation of structures and pointers to structure Practice session: 1. Define a structure COMPLEX whose fields are real and imaginary parts of a complex number. Write a program to find sum of two complex numbers using pointers to structures. 2. Define a structure ADDRESS with following fields: street, block, area, country and pin code. Write a program to take input and print address of two persons using pointers to structures.	3	Talk	--- NOT APPLICABLE ---

## SESSION NUMBER : 35

**Session Outcome:** 1 Examine the rules to be imposed over collection to convert it into Stack data structure.

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Sub-task 1(Lecture): Introduction to data structures. Types of data structures. Introduction to stack data structure and operations on stack data structure (Push, Pop, and Display Operations) with the help of example below: Consider an initially empty stack S stored in array S[0..5]. Assume the TOP be the pointer that points to topmost element on stack. TOP is initialized to -1. Show the value of TOP after each statement has been executed. Indicate any errors that might occur. Push( 4); Push(1); Push(20); Push(-50); Push(120); Push( 230); int de1 = Pop(); int de2 = Pop(); int de3 = Pop(); int de4 = Pop(); int de5 = Pop(); int de6 = Pop(); Practice session: 1. Ask the student to write functions for push(), pop() and display(). 2. Ask the students to write program to design a stack that retrieves the minimum element in constant time. 3. Ask the students to write a program that uses stack data structure to print the prime factors of given positive integer in descending order.	2	Talk	Leading question

## SESSION NUMBER : 36

**Session Outcome:** 1 Sketch and implement stack data structure and its operations

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Practice session: 1. Given the following sequence of letters	3	Talk	--- NOT

<p>and asterisks: COR*O*NAV***IR***US*** Consider the stack data structure, supporting two operations push and pop. Suppose that for the above sequence, each letter (such as C) corresponds to a push of that letter onto the stack and each asterisk (*) corresponds a pop operation on the stack. Show the sequence of values returned by the pop operations</p> <p>1. Develop a C routine which accepts a string and checks whether the string is palindrome or not using stack data structure. Example-1: Please enter the string: palace The string is not a palindrome. Example-2: Please enter the string: racecar The string is a palindrome.</p> <p>2. Implement a program in C to input a two-digit number and store all its divisors in a stack. The program should display divisors.</p> <p>3. Consider the following sequence of push and pop operations on an initially empty stack S. S = push(S,1); S = pop(S); S = push(S,2); S = push(S,3); S = pop(S); S = push(S,4); S = pop(S); S = pop(S); Outline each operation and write the correct order of the values popped.</p> <p>4. Implement a C routine compare () that compares two stacks and returns 0 if they are equal?</p>			<b>APPLICABLE</b> --- 
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**SESSION NUMBER : 37****Session Outcome: 1** Apply operations on queue dtata structure

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	<p>Sub-task 1(Lecture): Explanation on Queue Linear Data structure. Explain the method of inserting and deleting into Queue with the help of example below: Suppose that Q is an initially empty array-based queue of size 3. Show the values of the data members front and back after each statement has been executed. Indicate any errors that might occur.</p> <p>Queue Q[3] ); front = _____ back = _____  Q.enqueue ( 30120 ); front = _____ back = _____  Q.enqueue ( 30541); front = _____ back = _____  Q.enqueue ( 40850 ); front = _____ back = _____  Q.enqueue ( 10020 ); front = _____ back = _____ int de1 = _____  Q.dequeue(); front = _____ back = _____ Q.enqueue (31252 ); front = _____ back = _____ int de2 = Q.dequeue( ); front = _____ back = _____ int de3 = Q.dequeue( ); front = _____ back = _____ int de4 = Q.dequeue( ); front = _____ back = _____ Q.enqueue (70024 ); front = _____ back = _____ Practical Session:</p> <p>1. Declare a struct named as Queue. Define the operation such as Enqueue(), Dequeue() and Display() to insert an element, to delete an element and to display the element in the Queue. Check the Queue is full or empty by defining two functions as isEmpty() or isFull().</p> <p>2. Write a program to print a sequence of fibnoacci number using Queue data structure.</p>	3	Talk	--- NOT APPLICABLE --- 

**SESSION NUMBER : 38**

**Session Outcome: 1** 2. Implement create, insert and display operations on single linked list

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Single linked list-Insert Explain SINGLE LINKED LIST: CREATE, INSERT, DISPLAY Operations Practice session: 1. 1. Write a C program to create a single linked list and display the elements in the list and also perform insert operation	3	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 39**

**Session Outcome: 1** Write syntactically correct delete operation of single linked list

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
20	Quiz	2	LTC	Quiz/Test Questions
10	Explain various kinds of delete operations	2	Talk	--- NOT APPLICABLE ---
20	Design a function to delete first node in SLL 2. Write a function to delete the last node in SLL 3. Write a function to delete node at given position in SLL	2	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 40**

**Session Outcome: 1** Understand trees and tree terminology

**Session Outcome: 2** Construct different kinds of binary trees

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
25	Explain Tree, tree terminology, Tree nomenclature, Binary tree, Properties of binary tree, Different kinds of binary Tree	2	Talk	--- NOT APPLICABLE ---
25	1. Construct a complete binary tree from given elements 10,30,5,15,25,36. 2. Construct a full binary tree from the following list of elements 1,2,3,4,5,6,7,8,9	2	Talk	--- NOT APPLICABLE ---

**Tutorial Course DELIVERY Plan:** NO Delivery Plan Exists

**Tutorial Session wise Teaching – Learning Plan**

No Session Plans Exists

**Practical Course DELIVERY Plan:**

Tutorial Session no	Topics	CO-Mapping
1	Algorithms & Flowcharts	CO5
2	Data Types	CO5
3	Modularization and Storage classes	CO5
4	conditional statements and input, output	CO5
5	Loop statements- while	CO5
6	Loop statements- for	CO5
7	Recursion	CO5
8	Strings	CO5
9	1-D arrays	CO5
10	2-D Arrays	CO5
11	structures and stack	CO5
12	Queue	CO5
13	Linked List	CO5

### Practical Session wise Teaching – Learning Plan

SESSION NUMBER : 1

Session Outcome: 1 Design and draw flowcharts to solve computational problems

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	1. Write an algorithm to find sum of natural numbers. 2. Write an algorithm to convert radians into tan degree	2	LTC	--- NOT APPLICABLE ---
30	3. Write an algorithm and flowchart to generate supermarket bill	2	LTC	--- NOT APPLICABLE ---
20	viva	1	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 2****Session Outcome: 1 Understand Basic Data Types**

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	1. Develop a program to generate electricity bill based on units consumed 2. Develop a program to read temperature as centigrade and display the suitable message	2	LTC	--- NOT APPLICABLE ---
30	3. Write a program to read (x1,y1) & (x2,y2) from files and find the distance between two points	2	LTC	--- NOT APPLICABLE ---
20	viva	2	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 3****Session Outcome: 1 Apply modularization to develop programs**

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
35	Anuj takes a loan of Rs. 7,00,000 to pay his B.Tech fees from his friend at 12.5% rate of interest. He needs to clear the dues to get the No Objection Certificate. Help him in finding out the amount to be paid with interest to the bank. Interest is computed using Simple Interest for a period of 4 Years. Pass inputs as parameters to a function name Simple_Interest which will return the interest to the main function	3	LTC	--- NOT APPLICABLE ---
30	Mr. Ravi has prepared a test-1 question paper for 1st year B. Tech. The test consists of 3 questions with each question having certain marks assigned to it. However, Mr. Ravi has assigned distinct marks for each of 3 questions. This means no two questions can have the same marks. Find the minimum and maximum marks that he set the paper for. Solve this problem using arrays by declaring the array globally	3	LTC	--- NOT APPLICABLE ---
25	Six friends go on a trip and are looking for accommodation. After looking for hours, they find a hotel which offers two types of rooms — double rooms and triple rooms. A double room costs Rs. X, while a triple room costs Rs. Y. The friends can either get three double rooms or get two triple rooms. Find the minimum amount they will have to pay to accommodate all six of them	3	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 4****Session Outcome: 1 write programs using conditional statements, input and output statements**

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Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Consider a closed circuit containing ten resistors connected in series with resistances 10, 12, 13, 22, 34, 44, 45, 5, 55, 7 respectively. Write the resistances to a file named res.txt and find the average resistance of the circuit	3	LTC	--- NOT APPLICABLE ---
30	Your local library needs your help! Given the expected and actual return dates for a library book, create a program that calculates the fine (if any).	3	LTC	--- NOT APPLICABLE ---
30	Krishna is playing with his mobile and his mother tries to teach him basic arithmetic calculations in mobile. Whenever he clicks on + symbol it performs addition likewise other operations are also explained. Now Krishna is assigned to take two numbers and perform the basic arithmetic operations. Now your task is to help Krishna in choosing the symbol and its operation. (Hint: + addition, - subtraction, * multiplication, / division operations using Switch Statement)	3	LTC	--- NOT APPLICABLE ---
10	Viva	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 5****Session Outcome:** 1 write programs using loops

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Shivam is the youngest programmer in the world, he is just 12 years old. Shivam is learning programming and today he is writing his first program. The task is very simple: given two integers A and B, write a program to add these two numbers and output it.	2	LTC	--- NOT APPLICABLE ---
30	The Fibonacci numbers, commonly denoted $F(n)$ form a sequence, called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from 0 and 1. That is, $F(0) = 0$ , $F(1) = 1$ $F(n) = F(n - 1) + F(n - 2)$ , for $n > 1$ . Given $n$ , calculate $F(n)$ .	3	LTC	--- NOT APPLICABLE ---
30	Ravi likes printing tables. So, whenever he finds a number, he will print a table for it. Given an integer, $n$ , print its first 10 multiples	3	LTC	--- NOT APPLICABLE ---
10	Viva	2	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 6****Session Outcome:** 1 write programs using loops

Time(min)	Topic	BTL	Teaching-	Active
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			Learning Methods	Learning Methods
30	On the eve of Diwali, Hari is decorating his house with a serial light bulb set. The serial light bulb set has N bulbs placed sequentially on a string which is programmed to change patterns every second. If at least one bulb in the set is on at any given instant of time, how many different patterns of light can the serial light bulb set produce? Note: Lighting two bulbs *-* is different from **-	2	LTC	--- NOT APPLICABLE ---
30	Hari wants to construct a staircases pattern using the '#' symbol. He is very busy at CRT training. Your task is to help Hari to print this staircase pattern	3	LTC	--- NOT APPLICABLE ---
30	Sony is writing tables by inputting two numbers (e.g., 4 and 9) and display their math tables up to 10 and she is not interested to display the values when multiplier and multiplicand are the same. So, by skipping that condition she must display the table	3	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 7****Session Outcome:** 1 write recursive solutions

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Srujan asks his son Arun to calculate the sum of total natural numbers present on the board. Arun starts summing the natural numbers and after reaching up to 10 he gets confused and again starts counting from first. Your task is to help Arun to calculate the sum of total natural numbers recursively.	2	LTC	--- NOT APPLICABLE ---
30	Arun's programming tutor challenged him to discover the power of a number by comparing the iterative and recursive processes. Assist Arun in discovering the power of a number	3	LTC	--- NOT APPLICABLE ---
30	The following example calculates the factorial of a given number using a recursive function – Finding Factorial recursively	3	LTC	--- NOT APPLICABLE ---
10	Viva	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 8****Session Outcome:** 1 write programs using string

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Length of Last Word	3	LTC	--- NOT APPLICABLE ---

30	Valid Palindrome	3	LTC	--- NOT APPLICABLE ---
20	Equivalent-strings	3	LTC	--- NOT APPLICABLE ---
20	Search Insert Position	3	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 9****Session Outcome:** 1 write programs using arrays

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Add to Array-Form of Integer	3	LTC	--- NOT APPLICABLE ---
30	Linear search	3	LTC	--- NOT APPLICABLE ---
30	Bubble sort	3	LTC	--- NOT APPLICABLE ---
10	Viva	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 10****Session Outcome:** 1 use 2-D arrays

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
20	Search in a Sorted Matrix	2	LTC	--- NOT APPLICABLE ---
20	Convert 1D Array Into 2D Array Search a 2D Matrix	3	LTC	--- NOT APPLICABLE ---
60	Boxes through a Tunnel Sinking Ship	3	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 11****Session Outcome:** 1 apply CRUD operations on stack

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Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
30	Structures in C(code chef)	2	LTC	--- NOT APPLICABLE ---
30	Simple stack	2	LTC	--- NOT APPLICABLE ---
30	stack operations	3	LTC	--- NOT APPLICABLE ---
10	Viva	1	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 12****Session Outcome:** 1 Apply operations on Queue

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	simple Queue	3	LTC	--- NOT APPLICABLE ---
50	Maximum Element (Queue)	3	LTC	--- NOT APPLICABLE ---

**SESSION NUMBER : 13****Session Outcome:** 1 Apply various operations on SLL

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	create and insert node in SLL	2	LTC	--- NOT APPLICABLE ---
50	Delete and Display operation of SLL	3	LTC	--- NOT APPLICABLE ---

**Skilling Course DELIVERY Plan:**

Skilling session no	Topics/Experiments	CO-Mapping
1	Algorithms	CO6

Skilling session no	Topics/Experiments	CO-Mapping
2	Flowcharts	CO6
3	Data Types	CO6

### Skilling Session wise Teaching – Learning Plan

**SESSION NUMBER : 1**

**Session Outcome:** 1 write algorithms

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Designing Algorithms	1	Talk	--- NOT APPLICABLE ---
50	Write an algorithm and flowchart to generate supermarket bill	2	Talk	--- NOT APPLICABLE ---

**SESSION NUMBER : 2**

**Session Outcome:** 1 Draw flowcharts

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
50	Flowcharts	2	Talk	--- NOT APPLICABLE ---
50	Flowcharts	2	Chalk	--- NOT APPLICABLE ---

**SESSION NUMBER : 3**

**Session Outcome:** 1 use Data Types

Time(min)	Topic	BTL	Teaching-Learning Methods	Active Learning Methods
40	Raja wants to become fit for which he decided to walk to the office and return home by walking. It is known that Raja office is X km away from his home. If his office is open on 5 days in a week, find the number of kilometers Raja travels through office trips in a week	2	LTC	--- NOT APPLICABLE ---
30	A Utopian tree sapling with a height of 1 inch is planted on	2	LTC	--- NOT

	day1. The tree grows 2 inches every day. Find the height of the tree in centimeters on nth day			APPLICABLE ---
30	There is a group of N friends who wish to enroll in a course together. The course has a maximum capacity of M students that can register for it. If there are K other students who have already enrolled in the course, determine if it will still be possible for all the N friends to do so or not. where N, M and K - the size of the friend group, the capacity of the course and the number of students already registered for the course	2	LTC	--- NOT APPLICABLE ---

**WEEKLY HOMEWORK ASSIGNMENTS/ PROBLEM SETS/OPEN ENDED PROBLEM-SOLVING EXERCISES etc:**

Week	Assignment Type	Assignment No	Topic	Details	co
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**COURSE TIME TABLE:**

	Hour	1	2	3	4	5	6	7	8	9
Day	Component									
Mon	Theory	V-S2,V-S5,V-S6,V-S9,V-S10,V-S11,V-S27	V-S2,V-S5,V-S6,V-S9,V-S10,V-S27	V-S12,V-S16,V-S17,V-S25,V-S26,V-S31	V-S26	--	V-S14	--	--	-
	Tutorial	--	--	--	--	--	--	--	--	-
	Lab	V-S13	V-S13	V-S1,V-S19	V-S1,V-S19	V-S7	V-S7	V-S26,V-S32	V-S26,V-S32	-
	Skilling	V-S3,V-S8,V-S21,V-S22,V-S23,V-S24,V-S28	V-S3,V-S8,V-S21,V-S22,V-S23,V-S24,V-S28	V-S18,V-S29,V-S30	V-S18,V-S29,V-S30	V-S4,V-S15,V-S20,V-S33	V-S4,V-S15,V-S20,V-S33	--	--	-
Tue	Theory	V-S7,V-S12,V-S23,V-S29	V-S7,V-S12,V-S23	V-S9,V-S13,V-S15,V-S21,V-S26	V-S13	V-S4,V-S5,V-S18	V-S18	--	--	-
	Tutorial	--	--	--	--	--	--	--	--	-
	Lab	V-S14	V-S14	V-S2,V-S20	V-S2,V-S20	V-S8	V-S8	V-S25,V-S31	V-S25,V-S31	-

	Skilling	V-S1,V-S10,V-S11,V-S22,V-S24,V-S25,V-S27,V-S32	V-S1,V-S10,V-S11,V-S22,V-S24,V-S25,V-S27,V-S32	V-S17,V-S30,V-S33	V-S17,V-S30,V-S33	V-S3,V-S6,V-S16,V-S19	V-S3,V-S6,V-S16,V-S19	--	--	--
Wed	Theory	V-S14,V-S18,V-S20,V-S24	V-S14,V-S20,V-S24	V-S8,V-S19,V-S28,V-S29	V-S28,V-S29	--	--	--	--	--
	Tutorial	--	--	--	--	--	--	--	--	--
	Lab	V-S11	V-S11	V-S15,V-S33	V-S15,V-S33	V-S3	V-S3	V-S22,V-S28	V-S22,V-S28	--
	Skilling	V-S1,V-S2,V-S4,V-S5,V-S6,V-S17,V-S22,V-S23,V-S25,V-S26,V-S31	V-S1,V-S2,V-S4,V-S5,V-S6,V-S17,V-S22,V-S23,V-S25,V-S26,V-S31	V-S7,V-S9,V-S32	V-S7,V-S9,V-S32	V-S10,V-S12,V-S13,V-S16	V-S10,V-S12,V-S13,V-S16	--	--	--
Thu	Theory	V-S2,V-S3,V-S13,V-S19,V-S28,V-S30	V-S3,V-S19,V-S30	V-S1,V-S6,V-S10,V-S21,V-S22,V-S32	V-S1,V-S6,V-S10,V-S21,V-S22,V-S32	V-S33	V-S33	--	--	--
	Tutorial	--	--	--	--	--	--	--	--	--
	Lab	V-S12	V-S12	V-S16	V-S16	V-S4	V-S4	V-S21,V-S27	V-S21,V-S27	--
	Skilling	V-S5,V-S15,V-S17,V-S18,V-S20,V-S26,V-S27	V-S5,V-S15,V-S17,V-S18,V-S20,V-S26,V-S27	V-S8,V-S31	V-S8,V-S31	V-S7,V-S9,V-S11,V-S14	V-S7,V-S9,V-S11,V-S14	--	--	--
Fri	Theory	V-S11,V-S15,V-S25,V-S27	V-S11,V-S15,V-S25	V-S1,V-S3,V-S32	--	V-S4,V-S20	V-S4	--	--	--
	Tutorial	--	--	--	--	--	--	--	--	--
	Lab	V-S5	V-S5	V-S9	V-S9	V-S17	V-S17	V-S23,V-S29	V-S23,V-S29	--
	Skilling	V-S7,V-S8,V-S10,V-S12,V-S14,V-S16,V-S18,V-S21,V-S23,V-S24,V-S30,V-S31,V-S33	V-S7,V-S8,V-S10,V-S12,V-S14,V-S16,V-S18,V-S21,V-S23,V-S24,V-S30,V-S31,V-S33	V-S2,V-S13,V-S28,V-S29	V-S2,V-S13,V-S28,V-S29	V-S6,V-S19	V-S6,V-S19	--	--	--

<b>Sat</b>	Theory	V-S7,V-S16,V-S17,V-S22	V-S16,V-S17	V-S23,V-S24,V-S30,V-S31,V-S33	V-S31	V-S8	V-S8	--	--	-
	Tutorial	--	--	--	--	--	--	--	--	-
	Lab	V-S6	V-S6	V-S10	V-S10	V-S18	V-S18	V-S24,V-S30	V-S24,V-S30	-
	Skilling	V-S9,V-S11,V-S15,V-S21,V-S25,V-S26,V-S28,V-S29,V-S32	V-S9,V-S11,V-S15,V-S21,V-S25,V-S26,V-S28,V-S29,V-S32	V-S3,V-S4,V-S13,V-S14,V-S27	V-S1,V-S2,V-S4,V-S13,V-S14,V-S27	V-S1,V-S2,V-S5,V-S12,V-S14,V-S20	V-S1,V-S2,V-S5,V-S12,V-S19,V-S20	--	--	-
<b>Sun</b>	Theory	--	--	--	--	--	--	--	--	-
	Tutorial	--	--	--	--	--	--	--	--	-
	Lab	--	--	--	--	--	--	--	--	-
	Skilling	--	--	--	--	--	--	--	--	-

#### **REMEDIAL CLASSES:**

Supplement course handout, which may perhaps include special lectures and discussions that would be planned, and schedule notified accordingly

#### **SELF-LEARNING:**

Assignments to promote self-learning, survey of contents from multiple sources.

S.no	Topics	CO	ALM	References/MOOCS
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#### **DELIVERY DETAILS OF CONTENT BEYOND SYLLABUS:**

Content beyond syllabus covered (if any) should be delivered to all students that would be planned, and schedule notified accordingly.

S.no	Advanced Topics, Additional Reading, Research papers and any	CO	ALM	References/MOOCS
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#### **EVALUATION PLAN:**

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Evaluation Type	Evaluation Component	Weightage/Marks		Assessment Dates	Duration (Hours)	CO1	CO2	CO3	CO4	CO5	CO6
<b>End Semester Summative Evaluation Total= 40 %</b>	<b>Skill Sem-End Exam</b>	Weightage	6		100						6
		Max Marks	50								50
	<b>End Semester Exam</b>	Weightage	24		180	6	6	6	6		
		Max Marks	100			25	25	25	25		
<b>In Semester Formative Evaluation Total= 24 %</b>	<b>Lab End Semester Exam</b>	Weightage	10		100					10	
		Max Marks	50								50
	<b>Ratings on Global Platforms</b>	Weightage	4		40	1	1	1	1		
		Max Marks	40			10	10	10	10		
<b>In Semester Summative Evaluation Total= 36 %</b>	<b>Skilling Continuous Evaluation</b>	Weightage	4		40						4
		Max Marks	50								50
	<b>ALM</b>	Weightage	5		30	2	1	1	1		
		Max Marks	40			10	10	10	10		
<b>In Semester Summative Evaluation Total= 36 %</b>	<b>Home Assignment and Textbook</b>	Weightage	5		45	2	1	1	1		
		Max Marks	40			10	10	10	10		
	<b>Continuous Evaluation - Lab Exercise</b>	Weightage	6		50						6
		Max Marks	50								50
<b>In Semester Summative Evaluation Total= 36 %</b>	<b>Semester in Exam-I</b>	Weightage	12		120	6	6				
		Max Marks	50			25	25				
	<b>Semester in Exam-II</b>	Weightage	12		120			6	6		
		Max Marks	50					25	25		
<b>In Semester Summative Evaluation Total= 36 %</b>	<b>Lab In Semester Exam</b>	Weightage	8		100						8
		Max Marks	50								50
	<b>Skill In-Sem Exam</b>	Weightage	4		100						4
		Max Marks	50								50

#### ATTENDANCE POLICY:

Every student is expected to be responsible for regularity of his/her attendance in class rooms and laboratories, to appear in scheduled tests and examinations and fulfill all other tasks assigned to him/her in every course. In every course, student has to maintain a minimum of 85% attendance to be eligible for appearing in Semester end examination of the course, for cases of medical issues and other unavoidable circumstances the students will be condoned if their attendance is between 75% to 85% in every course, subjected to submission of medical certificates, medical case file and other needful documental proof to the concerned departments.

#### DETENTION POLICY :

In any course, a student has to maintain a minimum of 85% attendance and In-Semester Examinations to be eligible for appearing to the Semester End Examination, failing to fulfill these conditions will deem such student to have been detained in that course.

#### PLAGIARISM POLICY :

Supplement course handout, which may perhaps include special lectures and discussions

**COURSE TEAM MEMBERS, CHAMBER CONSULTATION HOURS AND CHAMBER VENUE DETAILS:**

Supplement course handout, which may perhaps include special lectures and discussions

Name of Faculty	Delivery Component of Faculty	Sections of Faculty	Chamber Consultation Day (s)	Chamber Consultation Timings for each day	Chamber Consultation Room No:	Signature of Course faculty:
SHAIK RAZIA	L	3- MA,7- MA	-	-	-	-
SHAIK RAZIA	P	3- MA,7- MA	-	-	-	-
SHAIK RAZIA	S	7- MA,3- MA	-	-	-	-
HARITHA DONAVALLI	L	1-MA	-	-	-	-
SRIDEVI EMANDI	L	11- MA,19- MA	-	-	-	-
SRIDEVI EMANDI	P	11- MA,19- MA	-	-	-	-
SRIDEVI EMANDI	S	11- MA,19- MA	-	-	-	-
Zeelan CMAK	L	26-MA	-	-	-	-
Zeelan CMAK	P	26-MA	-	-	-	-
Zeelan CMAK	S	26-MA	-	-	-	-
DAMA ANAND	L	5- MA,29- MA	-	-	-	-
DAMA ANAND	P	5- MA,29- MA	-	-	-	-
DAMA ANAND	S	5- MA,29- MA	-	-	-	-
SIVA KUMAR PATHURI	L	23-MA	-	-	-	-
SIVA KUMAR PATHURI	P	23-MA	-	-	-	-
SIVA KUMAR PATHURI	S	23-MA	-	-	-	-
SUDARSA DORA BABU	L	16-MA	-	-	-	-

SUDARSA DORA BABU	P	16-MA	-	-	-	-	-
SUDARSA DORA BABU	S	16-MA	-	-	-	-	-
VELAGAPALLI PREMALATHA	L	10-MA,20-MA	-	-	-	-	-
VELAGAPALLI PREMALATHA	P	10-MA,20-MA	-	-	-	-	-
VELAGAPALLI PREMALATHA	S	10-MA,20-MA	-	-	-	-	-
AZMIRA KRISHNA	L	6-MA	-	-	-	-	-
AZMIRA KRISHNA	P	6-MA	-	-	-	-	-
AZMIRA KRISHNA	S	6-MA	-	-	-	-	-
SREERAM NIMMAGADDA	L	2-MA	-	-	-	-	-
SREERAM NIMMAGADDA	P	2-MA	-	-	-	-	-
SREERAM NIMMAGADDA	S	2-MA	-	-	-	-	-
RAJESH KUMAR ESWARAN	L	24-MA	-	-	-	-	-
RAJESH KUMAR ESWARAN	P	24-MA	-	-	-	-	-
RAJESH KUMAR ESWARAN	S	24-MA	-	-	-	-	-
KARIMUNNISA SYED	L	28-MA,14-MA	-	-	-	-	-
KARIMUNNISA SYED	P	28-MA,14-MA	-	-	-	-	-
KARIMUNNISA SYED	S	28-MA,14-MA	-	-	-	-	-
GANESAN T	L	4-MA,12-MA	-	-	-	-	-
GANESAN T	P	4-MA,12-MA	-	-	-	-	-
GANESAN T	S	4-MA,12-MA	-	-	-	-	-
U HARITA	L	8-MA	-	-	-	-	-
U HARITA	P	8-MA	-	-	-	-	-

U HARITA	S	8-MA	-	-	-	-	-
ASHOK BEKKANTI	L	25-MA,13-MA	-	-	-	-	-
ASHOK BEKKANTI	P	25-MA,13-MA	-	-	-	-	-
ASHOK BEKKANTI	S	25-MA,13-MA	-	-	-	-	-
MADUPU KUMAR	L	9-MA	-	-	-	-	-
MADUPU KUMAR	P	9-MA	-	-	-	-	-
MADUPU KUMAR	S	9-MA	-	-	-	-	-
PARASA GAYATRI	L	21-MA	-	-	-	-	-
PARASA GAYATRI	P	1-MA,21-MA	-	-	-	-	-
PARASA GAYATRI	S	1-MA,21-MA	-	-	-	-	-
Yamini Tondepu	L	15-MA	-	-	-	-	-
Yamini Tondepu	P	15-MA	-	-	-	-	-
Yamini Tondepu	S	15-MA	-	-	-	-	-
CHIRANJEEVI KOTHAPALLI	L	22-MA	-	-	-	-	-
CHIRANJEEVI KOTHAPALLI	P	22-MA	-	-	-	-	-
CHIRANJEEVI KOTHAPALLI	S	22-MA	-	-	-	-	-
YOGESH KAKDE	L	17-MA	-	-	-	-	-
YOGESH KAKDE	P	17-MA	-	-	-	-	-
YOGESH KAKDE	S	17-MA	-	-	-	-	-
Lavanya Chunduri	L	33-MA	-	-	-	-	-
Lavanya Chunduri	P	33-MA	-	-	-	-	-
Lavanya Chunduri	S	33-MA	-	-	-	-	-
Zubair Ashraf	L	27-MA	-	-	-	-	-
Zubair Ashraf	P	27-MA	-	-	-	-	-
Zubair Ashraf	S	27-MA	-	-	-	-	-
ALANGUDI BALAJI NAVANEETHA RAMA KRISHNAN	L	18-MA	-	-	-	-	-
ALANGUDI BALAJI NAVANEETHA RAMA KRISHNAN	P	18-MA	-	-	-	-	-
ALANGUDI BALAJI NAVANEETHA RAMA	S	18-MA	-	-	-	-	-

KRISHNAN							
RAMESH MYLAPALLI	L	32-MA	-	-	-	-	-
RAMESH MYLAPALLI	P	32-MA	-	-	-	-	-
RAMESH MYLAPALLI	S	32-MA	-	-	-	-	-
FARHAN SUFYAN	L	31-MA	-	-	-	-	-
FARHAN SUFYAN	P	31-MA	-	-	-	-	-
FARHAN SUFYAN	S	31-MA	-	-	-	-	-
Karri Bhaskar	L	30-MA	-	-	-	-	-
Karri Bhaskar	P	30-MA	-	-	-	-	-
Karri Bhaskar	S	30-MA	-	-	-	-	-

### GENERAL INSTRUCTIONS

Students should come prepared for classes and carry the text book(s) or material(s) as prescribed by the Course Faculty to the class.

### NOTICES

Most of the notices are available on the LMS platform.

All notices will be communicated through the institution email.

All notices concerning the course will be displayed on the respective Notice Boards.

### Signature of COURSE COORDINATOR

(SREERAM NIMMAGADDA)

### Signature of Department Prof. Incharge Academics & Vetting Team Member

Department Of DBES-1

### HEAD OF DEPARTMENT:

### Approval from: DEAN-ACADEMICS

(Sign with Office Seal) [object HTMLDivElement]