Lesson Plan No. 1	Course Name: Data Structure using C Topic: Introduction to Data structure	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the fundamental concept of Data Structures. b. Understand the need of data Structure. c. Identify different types of data structures. d. Operations performed on data structures.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) -Ask questions - What do you understand by the word data? - What are the different types of data present in C language ? -Do you know why is it important to store data in a particular manner? -Introduce the definition of Data Structures. -Talk about the real world examples of data structures. -Highlight the important characteristics of data structures. 2. **Development** (30 minutes) a. Data Structure basics - Introduce the concept of data structure including its commonly used applications like plotting of graphs, text editing etc. b. Need of data structures - Processor speed - Data Search - Multiple request c. Classification of data structures - Introducing primitive data structures(built-in data types) and non-primitive data structures(derived data types) -Show flow chart including examples of primitive data structure (int,char,float etc) and non primitive data structure(array, linked list, stack,queue , graphs,trees). - Give overview of non-primitive data structure. d. Need of data structures - Processor speed - Data Search - Multiple request e. Basic Operations performed on Data Structure - Traversing - Insertion - Deletion - Sorting

	3. Exercise (5 minutes) – -Highlight the basic concepts of data structure?
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 3. Homework - Create a presentation highlighting data structure concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Cloud Computing Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2	Course Name: Data Structure using C Topic: Number Systems	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the fundamental concept of Number System. b. Identify different types of number Systems. c. Convert one number system to another.
Teaching Aids (if any)	a. Projector, slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What do you understand by number system? What type of number system do you use for general purpose? - Introduce the concept of number system - Talk about the need of different number systems 2. **Development (30 minutes)** a. Concept of different number systems - Introduce different number systems - Talk about Decimal, Binary, Octal, Hexa Decimal b. Conversion of different number systems - Conversion of decimal to binary and binary to decimal. - Conversion of decimal to octal, octal to decimal - Conversion of octal to binary and binary to octal - Conversion of decimal to hexadecimal and hexadecimal to decimal. - Conversion of hexadecimal to binary and binary to hexadecimal.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on number system. https://nptel.ac.in/courses/106105085 3. Homework - Convert the given numbers to another forms and submit the answers on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C

	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4	Course Data Structure using C Topic: Arrays	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the fundamental concept of Arrays. b. Understand the need of Arrays. c. Identify different types of Arrays. d. Operations performed on Array.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. Introduction (5 minutes) - Ask questions What do you understand by Array? What is the use of Array? How does the array store Data? - Introduce the definition of Array. - Talk about the examples of Array. - Highlight the different types of Array. 2. Development (30 minutes) a. Array basics - Declaration of Array - Initializing Array - Accessing elements of Array b. Need of Arrays - Stores multiple number of elements. - Stores any kind of primitive data type. c. Classification of Arrays - 1-D Array - Multi-Dimensional Array d. Basic Operations performed on Arrays - Traversing - Insertion - Deletion - Sorting - Searching e. Concept of Searching in Arrays - Linear Search (search an element or value in a given array by traversing the array from the starting, till the desired element or value is found). - Binary Search(Searching a sorted array by repeatedly dividing the

	search interval in half.) 3. Exercise (5 minutes) - Ask Students to write down the program for Searching elements in an array. - Asking them which technique is better.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data Structure Using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 5	Course Name: Data Structure using C Topic: Multidimensional Arrays	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the different sorting techniques. b. Articulate basic concepts of Multi-Dimensional Arrays. c. Perform manipulations on Arrays
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. Introduction (5 minutes) - Ask questions What are the different operations that can be performed on array? What is Linear Search? What is Binary Search? - Introduce the concept of sorting. - Highlight the different types of Sorting techniques. 2. Development (30 minutes) a. Sorting of array (ascending/descending order) b. Different sorting techniques -Bubble Sort -Selection Sort -Insertion Sort -Merge Sort -Quicksort -Radix Sort - Shell sort c. Introduction to multi-dimensional array - Declaration - Initialization - Accessing elements in 2-D array d. Manipulations on 2-D array - Addition - Subtraction - Multiplication 3. Exercise (5 minutes) - Write down a program to add rows of 2-D array - Write down a program to add columns of 2-D array
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.

	2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 6	Course Name: Data structure using C Topic: Pointers in C	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the fundamental concept of Pointers. b. Understand Pointers and Array. c. Advantages of pointer.
Teaching Aids (if any)	Projector Slides a. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions How to initialize 2-D array? What is pointer? - Introduce the definition of pointer. - Give an example of pointer. 2. **Development (30 minutes)** a. Pointer basics - Discussion of pointer with example. - Declaration of pointer. - A detailed example of pointers b. Pointers and array - Relation of arrays and pointers. c. Advantages of pointer - Reduces the code and improves the performance. - Return multiple values from a function. - access any memory location d. Uses of Pointers - Dynamic memory allocation - Arrays, Functions, and Structures 3. Exercise (5 minutes) - Ask Students to write down the program to find the sum of n numbers with arrays and pointers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings.

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 7	Course Name: Data Structure Using C Topic: Dereferencing and void pointer	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of De-referencing. b. Know the need of De-referencing c. Articulate the basics of Void pointers.
Teaching Aids (if any)	a. Projector slides. b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What do you understand by pointer? What is the output of the program (from pointers and array) displayed on the screen? - Introduce the concept of de-referencing. 2. **Development (30 minutes)** a. De- Referencing basics - Representation of de-referencing pointer. - Steps to de-reference a pointer. - Detailed Example b. Need of dereferencing a pointer - to access or manipulate the data stored at the memory location, which is pointed by the pointer. - operation applied will directly affect the value of the variable that it points to. c. Basics of Void Pointers - Definition - Example of Void pointer d. Advantages of Void Pointer -Implement generic functions in C -malloc() and calloc() return void * type and this can help allocate memory of any data type 3. Exercise (5 minutes) - Ask Students to write down the program giving example of void pointer.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from

	students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 8	Course Name: Data Structure Using C Topic: Dynamic Memory Allocation	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Dynamic memory allocation. b. Identify and understand the basic functions used for dynamic memory allocation
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. Introduction (5 minutes) - Ask questions What is De-Referencing? What is the function of void pointer? - Introduce the need of Dynamic memory allocation. 2. Development (30 minutes) a. Dynamic memory allocation basics - definition of Dynamic memory allocation b. Library functions for Dynamic memory allocation -malloc(memory allocation) -calloc(contiguous allocation) -free(de-allocate) -realloc(re-allocation) c. Examples of all the functions - Difference between all the library functions (malloc, calloc, free, realloc) with the help of examples. 3. Exercise (5 minutes) -Ask Students to identify the use of each function required in dynamic memory allocation. -Collect the responses using Nearpod.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 9	Course Name: Data structure Using C Topic: Introduction to Stack	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the stack data structure b. Gain knowledge about different types of basic operations that can be performed in a stack. c. Articulate the applications of stack.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What is the difference between arrays and linked lists? What is the importance of both? What is the difference between physical and logical data structures? - Introduce the concept of stacks 2. **Development (30 minutes)** a. Introduction to stacks. - examples of stacks in daily life. - Significance of top of the stack. b. Basic operations on stacks - push - pop - peek - isEmpty - isFull c. Applications of stacks - String reversal - UNDO/REDO - Recursion - DFS (Depth First Search) - Backtracking - Expression conversion - Memory management 3. Exercise (5 minutes) - Ask students about the insertion and deletion onto a stack
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.

	2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 3. Homework - Create your video log highlighting cloud computing concepts and submit on Google classroom. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 10	Course Name: Data structure using C Topic: infix to postfix expression	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the different types of notations for expressions. b. Gain knowledge about parenthesis checking. c. Articulate about the conversion of infix to postfix expression.
Teaching Aids (if any)	a. Projector Slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What are the applications of stacks? Why do we need to check the balancing of parenthesis? Why do we need to convert infix into postfix expression? - Introduce the concept of infix, prefix and postfix expressions. 2. **Development (30 minutes)** a. Introduction to types of expressions with examples. - Infix - Postfix - Prefix b. Briefing the rules that are to be followed for the conversion of infix expression to the postfix expression. Explaining with examples. 3. Exercise (5 minutes) - Ask students to evaluate the postfix expression for the following A+b*c A-b/c*d+e K + L - M*N + (O^P) * W/U/V * T + Q A-B+(M^N)*(O+P)-Q/R^S*T+Z
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data Structure Using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 11	Course Name: Data Structure using C Topic: Stack implementation	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the different types of implementations of stacks. b. Gain knowledge about implementation of stacks in C using arrays c. Articulate about hoe to perform different stack operations using arrays.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What is a stack data structure? What is the importance static and dynamic stack implementation? - Introduce the concept of implementation of stacks. 2. **Development (30 minutes)** a. Introduction to arrays and stacks. - Significance of using arrays for implementing stack. - Explaining the array implementation of stack. b. Implementation of basic operations on stacks using arrays - push - pop - peek - isEmpty - isFull 3. Exercise (5 minutes) - Ask students about the insertion and deletion onto a stack - Stack A has the entries a,b,c(with a on top). Stack B is empty. An entry popped out of stack A can be printed immediately or pushed to stack B. An entry popped out of stack B can be only printed. In this arrangement, which of the following are not possible? b,a,c b,c,a c,a,b a,b,c
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from

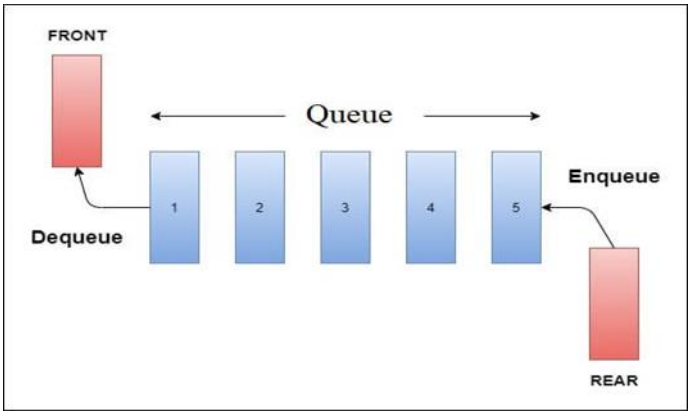
	students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 12	Course Name: Cloud Computing Topic: Infix to prefix expression	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of postfix evaluation. b. Gain knowledge about the infix to prefix conversion. c. Articulate about how to evaluate an expression given in postfix notation.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What is the difference between postfix and prefix notation? Why do we need to perform the conversions? - Introduce the concept of postfix expression evaluation and infix-prefix conversion. 2. **Development (30 minutes)** a. Introduction to postfix evaluation -Rules to evaluate a postfix expression. -Examples for evaluation 456*+ 53+83-* 35*62/+4- 2 3 1 * + 9 – 53+62/*35*+ b. Infix to prefix conversion - discuss the rules for infix to prefix conversion. 3.Exercise (5 minutes) -Ask students to convert the given infix expression to prefix (A+B)+C-(D-E)^F
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data Structure using C

	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 13	Course Name: Data structure using C Topic: Introduction to Queue	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the queue data structure b. Gain knowledge about different types of basic operations that can be performed in a queue. c. Articulate the applications of queue.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What is the principle of working of a stack? What is the importance of top variable? What is the difference between insertion and deletion in terms of top variable? - Introduce the concept of queues. 2. **Development (30 minutes)** a. Introduction to queues. - examples of queues in daily life. - Significance of maintaining two variables in case of queue. • Front • Rear  b. Basic operations on stacks - enqueue - dequeue - peek - display - isEmpty - isFull

	c. Applications of stacks - Managing requests on a single shared resource - Handling hardware or real-time systems interrupts - Handling website traffic - Routers and switches in networking - Maintaining the playlist in media players 3. Exercise (5 minutes) - Ask students about the insertion and deletion in a queue
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 https://www.geeksforgeeks.org/queue-data-structure/ Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 14	Course Name: Data Structure Using C Topic: Introduction to Linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the Disadvantages of Arrays. b. Articulate the concept and uses of Linked List.
Teaching Aids (if any)	a. Projector Slides b. Use of Nearpod tool for online quiz
Teaching Development	1. Introduction (5 minutes) - Ask questions What do you understand by Structure? What is the need of structure? What is structure-pointer concept? - Introduce the drawbacks of arrays. 2. Development (30 minutes) a. Disadvantages of Arrays - wastage of memory. - Slow Insertion/Deletion Time b. Linked List Basics - Definition - Concept of nodes -Representation c. Uses of Linked list - optimized utilization of space - No advance declaration of memory size - No Empty node d. Why Linked List over array -allocates the memory dynamically -List grows as per the program's demand 3. Exercise (5 minutes) -Ask Students to why link list is preferable over arrays
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learning

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using c Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 15	Course Name: Data Structure using C Topic: Types of linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Identify different types of Linked List. b. Articulate how different types of linked list contribute to the data structures
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What are the disadvantages of array? What is Linked list? What is node and how it is partitioned? - Introduce the different types of linked list. 2. **Development (30 minutes)** a. Classification of linked list -Singly linked lists -Doubly linked lists -Circular linked lists -Circular doubly linked lists b. Concept of different types of Linked List -Singly linked lists (unidirectional linked list) - Doubly linked lists (bi-directional linked list) - Circular Linked Lists (last node pointing to the head node) - Circular doubly linked lists (mixture of a doubly linked list and a circular linked list) 3. Exercise (5 minutes) - Ask students regarding the difference in different types of linked list. Collect Responses with the help of Nearpod.
Closure	1Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures.

	https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No.16	Course Name: Data Structure using C Topic: deletion operation in linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the logic behind the deletion of a node in a linked list. b. Gain knowledge about the types of deletions in a linked list. c. Articulate how nodes and links are updated while deletion process in a linked list.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions How do we traverse a linked list? What are the different modes of insertion? How can we count the number of nodes in a single linked list? - Introduce the concept of using deletion of nodes in a linked list. 2. **Development (30 minutes)** a. Introduction to deletion process. - to check if list is empty or not. - to find out different modes of deletion in case of a linear linked list b. Deletion in a linear linked list - at the beginning of the linked list - At the end of the linked list - After a specific position c. Code to delete a node linked list - program to give a detailed explanation of deletion of a node in a linked list 3. Exercise (5 minutes) - Ask students about the deletion of node at 4th position in a linked list 5->10->15->20->25->30.
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085

	Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 17	Course Name: Data structure using C Topic: Introduction to linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the structure a doubly linked list. b. Gain knowledge about the operations that can be performed in a doubly linked list. c. Articulate how nodes are traversed in a doubly linked list.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. Introduction (5 minutes) - Ask questions What is the structure of a single linked list? What is the difference between single and double linked list? - Discuss the advantages and disadvantages of double linked list over linear linked list 2. Development (30 minutes) a. Introduce the structure of double linked list - Use of structure to create node b. Declaration of Double Linked Lists - first variable as data - next as a pointer (keep the address of the next node) - prev as a pointer (keep the address of the prev node) c. Example of a double linked list - program to give a detailed explanation of creation of double linked list. 3. Exercise (5 minutes) - Ask students about the nodes and give them a program of traversal of a double linked list.
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structure using C

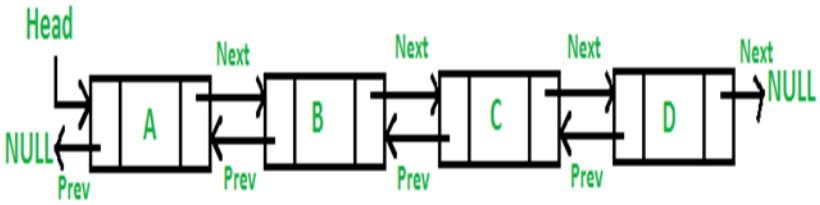
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 18	Course Name: Data structure using C Topic: Deletion operations in linear linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the logic behind the deletion of a node in a linked list. b. Gain knowledge about the types of deletions in a linked list. c. Articulate how nodes and links are updated while deletion process in a linked list.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions How do we traverse a linked list? What are the different modes of insertion? How can we count the number of nodes in a single linked list? - Introduce the concept of using deletion of nodes in a linked list. 2. **Development (30 minutes)** a. Introduction to deletion process. - to check if list is empty or not. - to find out different modes of deletion in case of a linear linked list b. Deletion in a linear linked list - at the beginning of the linked list - At the end of the linked list - After a specific position c. Code to delete a node linked list - program to give a detailed explanation of deletion of a node in a linked list 3. Exercise (5 minutes) - Ask students about the deletion of node at 4th position in a linked list 5->10->15->20->25->30.
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures.

	https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data Structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 19	Course Name: Data structures using c Topic: Creation and traversal in Doubly linked lists	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the structure a doubly linked list. b. Gain knowledge about the operations that can be performed in a doubly linked list. c. Articulate how nodes are traversed in a doubly linked list.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions What is the structure of a single linked list? What is the difference between single and double linked list? - Discuss the advantages and disadvantages of double linked list over linear linked list 2. **Development (30 minutes)** a. Introduce the structure of double linked list - Use of structure to create node b. Declaration of Double Linked Lists - first variable as data - next as a pointer (keep the address of the next node) - prev as a pointer (keep the address of the prev node)  c. Example of a double linked list - program to give a detailed explanation of creation of double linked list. 3. Exercise (5 minutes) - Ask students about the nodes and give them a program of traversal of a double linked list.
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading

	Online nptel course on data structures. https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data structures using C Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 20	Course Name: Data Structure Using C Topic: Insertion operation in Doubly linked list	Course No.: COM-201

Objectives	At the end of the lesson the student shall be able to: a. Understand the types of insertion operations that can be performed in a linked list. b. Gain knowledge about the updation of links of nodes in a linked list c. Articulate how nodes can be inserted at different position in a linked list.
Teaching Aids (if any)	a. Projector slides b. Use of Nearpod tool for online quiz
Teaching Development	1. **Introduction (5 minutes)** - Ask questions How can we traverse a doubly linked list? What is the difference between traversal and insertion? - Introduce the concept of insertion in a doubly linked list. 2. **Development (30 minutes)** a. Introduction to insertion - to check if list is empty or not. b. Insertion in a doubly linked list - at the beginning of the linked list - At the end of the doubly linked list - After a specific position in a doubly c. Example to insert a node linked list - program to give a detailed explanation of insertion in a doubly linked list 3. Exercise (5 minutes) - Ask students about the insertion and traversal of nodes and give them a program of insertion 30 at 4th position in a linked list 5,10,15,20,25,30.
Closure	1.Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2.Suggested Reading Online nptel course on data structures.

	https://nptel.ac.in/courses/106105085 Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Data Structure using C Spend 5 minutes to evaluate student assimilation of the lesson contents