Week	Topics
1	Course Orientation, Programming Fundamentals revised using syntax of C++
2	User-defined simple data types, Namespaces, Arrays and Strings
3	Records
4	Introduction to Object Oriented Paradigm, Classes and Objects
5	Defining classes
6	Pointers with classes
7	Composition, Introduction to Inheritance
8	Types of Inheritance
9	Virtual Functions, Abstract Classes, Polymorphism
10	Operator Overloading
11	Templates
12	Exception Handling and Recursion
13	Linked List
14	Queue, Stack, Standard Templates Library
15	Project Presentations

Week	Lecture	Date	Topics	Evaluations used				
1	1	24-01-2023	Introduction to the course, course objectives, course policies, grade distribtution, Semester Project deliverables; Introduction to Procedural and Object Oriented Paradigms, Structured Programming; Stages in C++ Program Execution; Hello World in C++; Introduction to the concept of namespace					
	2	25-01-2023	Recap of the last lecture, the concept of variable, the type and size of variable revised, the concept of arithmetic and relational operators revised, an example to demonstrate the steps in devising an algorithm, an example to demonstrate the use of functions, loops and conditional statements	**Quiz 1; Reading assignment 1: Basics of C++ Programming**				
2	3	31-01-2023	Recap of the last lecture, Introducing the cocept of a class and an object, the relationship between a class and an object, difference between method and a function; Input/Output in C++ using cin and cout, methods of istream like ignore(), peek(), pushback(), stream manipulators like setfill(), setw(), left, right, endl;	**Home Task**				
	4	02-02-2023	Concepts of function overloading, default parameters; The concepts of pass by value and pass by reference revised, Pass by reference in C++ using pointers and reference variables, Passing arrays to functions revised; Strings in C++: C-style strings and string manipulation functions of cstring library, Strings as objects of class string, predefined methods of class string					
3	5	07-02-2023	Introduction to the concept of Structure as a user-defined complex type, the need for using a structure, the syntax for defining a structure, declaring and initializing structure variables, accessing members of structure variables using dot operator, assigment of two structure variables, the restriction on use of relational operators on structure variables, passing structure variables by value to a function, returning a structure variable from a function, having complex types like enumerations and structures within a structure, accessing structure variable within a structure, having array as data member in a structure, declaring an array of structure variables					
	6	09-02-2023	Passing structure variables by reference to a function using reference variables and pointers, using arrow operator wilth a pointer to a structure variable, Practice problems with structures in class, Introduction to the concept of enumeration, defining enumeration, declaring variables of type enumerations, how to use arithmetic operators on enumerations.	**Class Activity: Write programs on piece of paper involving structures**				
4	7	14-02-2023	Introduction to the concept of classes, class as a data type containing data members and methods, access modifiers: private and public, why data members are generally private and methods are generally public, accesing public memvers, setters and getters in class definition	**Quiz 2: Structures**				
	8	16-02-2023	Constant Methods, Passing objects by value and by reference, Constant object as a a parameter, Introduction to the concept of constructor, default constructor, parameterized constructor, combining parameterized constructor with default constructor using default parameters, the concept of destructor					
5	9	21-02-2023	Recap of concepts of previous week, Defining arrays of objects, Introduction to the concept of "Separation of Concerns" where the class definition, methods definition and client code are kept in separate files, Introduction to the concept of dynamic memory					
	10	23-02-2023	Dynamic Memory: Using new and delete operators to allocate and deallocate dynamic memory, Concept of memory leak and dangling pointer associated with dynamic memory, How to handle memory leak and dangling pointers; Concepts of destructor and copy constructor revisited for the classes containing pointers as data members	**Quiz 3: Classes and Objects**				
6	11	28-02-2023	Recap of Dynamic memory, destructor and copy constructor concepts, Revision of static local variables, Introduction to the concept of Static data members, static methods, Introduction to the concept of Class Diagrams					
		02-03-2023	Missed due to sports week					
7	12	07-03-2023	Recap of concepts of Class Diagram, Static members of the class, Creating objects using new keyword, Accessing object members via arrow operator, The concept of this operator					
	13	09-03-2023	Recap of the entire course covered so far, Practice Questions in class					
8		14-03-2023	**Sessional-1**					
	14	16-03-2023	Discussion of Sessional-1 paper, Recap of Composition by demonstrating an example, Difference between composition and using an object of a another class in a method of a class					

9	15	21-03-2023	File Handling in C++, Reading and writing to text and binary files						
	16	21-03-2023	Introduction to the concept of Inheritance, demonstrating problems in solving an inheritance problem using composition		Rescheduled class missed during Sports Week				
		23-03-2023	Missed due to Pakistan Day Holiday						
10	17	28-03-2023	Introduction to the concept of Inheritance, Concepts of base/parent and derived/child class in Inheritance, Inheriting methods and data members, Access of inherited private data members, Concept of method overriding, Calling method of parent class with same name as that in child class, Concept of method overloading in inheritance						
	18	28-03-2023	Recap of method overriding and method overloading concepts, the concept of constructors in inheritance, default constructor of derived class automatically calling default constructor of base class, explicit call to parameterized constructor of base call in the parameterized constructor of derived class, Sequence of constructors/destructors executed in inheritance, Introduction to the concept of protected members, types of inheritance: public, protected and private inheritance		Rescheduled class missed due to Pakistan Day Holiday				
	19	29-03-2023	Recap of different types of inheritance, Introduction to the concept of slicing problem when copying an object of child class to an object of base class, Introduction to the concept of compile time binding, Intorduction to the concept of Polymorphism	**Quiz 4: Types of Inheritance**					
11	20	04-04-2023	Need for polymorphism, how to achieve run-time binding by the use of keyword virtual and use of references, The concept of Abstract class and pure virtual functions						
	21	06-04-2023	Recap of polymorphism, Diamond Problem and its solution	**Class Diagram and Progress Presentation**					

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1	1	24-01-2023	Introduction to the course: course objectives, course policies, grade distribtution; Introduction to Procedural and Object Oriented Paradigms, Structured Programming; Stages in C++ Program Execution; Hello World in C++, Introduction to the concept of namespace; Concept of variables and variable types revisited, Concept of arithmetic and relational operators revisited	Class activity: Program to guess a number	
	2	26-01-2023	Recap of the last lecture, Input/Output in C++ using cin and cout, stream manipulators like setfill(), setw(), left, right, endl, ignore(), peek(), pushback(); Idea of a Class as a type, string as object, difference between a method and a function		
2	3	01-02-2023	Introducing the cocept of a class and an object, the relationship between a class and an object, Using strings in C++: C-style strings string manipulation functions in cstring, Strings as objects of class string, some predefined methods of class string; Introduction to the concepts of function overloading and default parameters; The concepts of pass by value and pass by reference revised, Pass by reference in C++ using pointers and reference variables		
	4	03-02-2023	Introduction to the enumeration type, defining and using enumeration, defining namespaces, using typedef	**Quiz 1**	
3	5	08-02-2023	Introduction to the concept of Structure as a user-defined complex type, the need for using a structure, the syntax for defining a structure, declaring and initializing structure variables, accessing members of structure variables using dot operator, assigment of two structure variables, the restriction on use of relational operators on structure variables, passing structure variables by value to a function, returning a structure variable from a function, having complex types like enumerations and structures within a structure, accessing structure variable within a structure, having array as data member in a structure, declaring an array of structure variables		
	6	10-02-2023	Passing structure variables by reference to a function using reference variables and pointers, using arrow operator wilth a pointer to a structure variable, Practice problems with structures in class, Introduction to the concept of enumeration, defining enumeration, declaring variables of type enumerations, how to use arithmetic operators on enumerations.	**Class Activity: Write programs on piece of paper involving structures**	
4	7	15-02-2023	Introduction to the concept of classes, class as a data type containing data members and methods, access modifiers: private and public, why data members are generally private and methods are generally public, accesing public memvers, setters and getters in class definition	**Quiz 2: Structures**	

	8	17-02-2023	Constant Methods, Passing objects by value and by reference, Constant object as a a parameter, Introduction to the concept of constructor, default constructor, parameterized constructor, combining parameterized constructor with default constructor using default parameters, the concept of destructor			
5	9	22-02-2023	Recap of concepts of previous week, Defining arrays of objects, Introduction to the concept of "Separation of Concerns" where the class definition, methods definition and client code are kept in separate files, Introduction to the concept of dynamic memory			
	10	24-02-2023	Dynamic Memory: Using new and delete operators to allocate and deallocate dynamic memory, Concept of memory leak and dangling pointer associated with dynamic memory, How to handle memory leak and dangling pointers; Concepts of destructor and copy constructor revisited for the classes containing pointers as data members	**Quiz 3: Classes and Objects**		
6	11	01-03-2023	Recap of Dynamic memory, destructor and copy constructor concepts, Revision of static local variables, Introduction to the concept of Static data members, static methods, Introduction to the concept of Class Diagrams			
		03-03-2023	Missed due to NUTEC			
7	12	08-03-2023	Recap of concepts of Class Diagram, Static members of the class, Creating objects using new keyword, Accessing object members via arrow operator, The concept of this operator			
	13	10-03-2023	Recap of the entire course covered so far, Practice Questions in class			
8	14	15-03-2023	Discussion of Sessional-1 paper, Concept of Composition with focus on defining the parameterized constructor of the whole class			
	15	17-03-2023	Recap of Composition by demonstrating an example, Difference between composition and using an object of a another class in a method of a class, File Handling in C++: Reading and writing to text and binary files			
9	16	20-03-2023	Introduction to the concept of Inheritance, demonstrating problems in solving an inheritance problem using composition			
	17	22-03-2023	Concepts of base/parent and derived/child class in Inheritance, Inheriting methods and data members, Access of inherited private data members, Concept of method overriding, Calling method of parent class with same name as that in child class, Concept of method overloading in inheritance			
	18	24-03-2023	Recap of method overriding and method overloading concepts, the concept of constructors in inheritance, default constructor of derived class automatically calling default constructor of base class, explicit call to parameterized constructor of base call in the parameterized constructor of derived class, Sequence of constructors/destructors executed in inheritance, Introduction to the concept of protected members, types of inheritance: public, protected and private inheritance			

10	19	29-03-2023	Introduction to the concept of slicing problem when copying an object of child class to an object of base class, Introduction to the concept of compile time binding, Introduction to the concept of Polymorphism	**Quiz 4: Types of Inheritance**		
	20	31-03-2023	Need for polymorphism, how to achieve run-time binding by the use of keyword virtual and use of references, The concept of Abstract class and pure virtual functions			
11	21	05-04-2023		**Class Diagram and Progress Presentation**		
		07-04-2023	Recap of polymorphism, Diamond Problem in multiple inheritance and it's solution			
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