OOP Concept and C++

Curriculum

- **Introduction to Object-Oriented Programming**
  - Define Object-oriented Programming (OOP)
  - Differentiate between Object oriented and Object-based programming
  - Explain the concepts of OOP
  - List the advantages and disadvantages of OOP
- **Object-oriented Design**
  - Explain Object-oriented design (OO Design)
  - Describe Responsibility-driven Design (RDD)
  - Explain Agents, Classes, and Instances
  - Describe Methods, Responsibilities, and Modules
  - Explain Generalization, Specialization, and Patterns
  - Explain Coupling and Cohesion
- **Classes and Methods**
  - Explain Class
  - Describe Visibility Modifiers
  - Explain Methods
  - Explain Static data fields and Constant data fields
  - Describe Accessor, Mutator, and Forward declaration
- **Abstraction and Inheritance**
  - Define Abstraction
  - Explain Levels of Abstraction
  - Define Inheritance
  - Explain Types of Inheritance
  - Explain Variants in Inheritance
  - List the Advantages of Inheritance
- **Multiple Inheritance and Interfaces**
  - Describe Multiple Inheritance
  - List the problems associated with Multiple Inheritance
  - Describe Interface
  - Explain Multiple Inheritance using Interfaces
  - Explain constructor execution in Multiple Inheritance
- **Polymorphism**
  - Explain Polymorphism
  - List the different forms of Polymorphism
  - Define Overloading and Overriding
  - Define Polymorphic variable and Generics

- Explain Static and Dynamic Polymorphism

- **Overloading**
  - Explain Overloading
  - List the different forms of Overloading
  - Explain Method Overloading
  - Explain Constructor Overloading
  - Explain Operator Overloading
- **Overriding**
  - Explain Overriding
  - Explain Abstract method and Pure virtual methods
  - Explain Replacement and Refinement
  - Differentiate between Overriding and Shadowing
  - Differentiate between Overriding and Overloading
- **Polymorphic Variables**
  - Explain polymorphic variable
  - List types of polymorphic variables
  - Explain simple polymorphic variable
  - Explain pseudo-variable
  - Explain Reverse polymorphism
- **Functions, Pointers and Arrays**
  - Identify what functions do and their structure
  - Discuss the arguments of a function
  - Discuss return from the function and type of a function
  - Identify function declaration and function prototype
  - Understand the sizeof() operator
  - Discuss call by value and call by reference
  - Explain recursive functions and identify storage classes
  - Discuss functions in multifile programs
  - Express function declaration for extern functions
  - Discuss and use Pointers
  - Identify single dimensional arrays
  - Describe the process of initializing an array
  - Identify multidimensional arrays
- **Data Structures using C++ and Exception Handling**
  - Differentiate between pointers and references
  - Operate with stacks
  - Discuss linked lists
  - Define queues
  - Discuss the need of exception handling
  - Write simple error handling routines
  - Explain the function terminate()
  - Explain the function unexpected()