**OBJECT ORIENTED PROGRAMMING**

Course Title: Object Oriented Programming

Course Code: CS-1201

Prerequisite: Programming Fundamentals

**Course Description :**

This course is an introduction to the concepts of object-oriented paradigm along with javaFrame wok. In this course the following OOP topics will be covered: Evolution of Object Oriented programming, OOP concepts and principles, problems solving in OOP paradigm. OOP design process, classes, methods, objects, encapsulation, operator, method overloading, overriding, inheritance, abstraction, polymorphism, GUI and error handling. This course will be taught by combination of OOP theory, Java language and Lab work. Theoretical Lectures will be used to provide in depth and conceptual framework of each goal. Lectures with programming demonstration will be used provide the practice and applied knowledge/understanding of the concepts learned through theoretical concept. The combination of theory and programming will help students to develop their program writing and application designing skills. Lab work will help the students to analyze the real problems and solve it into the programming language. Assignments, quizzes, lab tests class participation and semester projects will be used as assessment tool to ensure and monitor students learning progress.

**Course Outlines :**

Overview of object-orientation. Overview of quality of software systems. Design and implementation. Object and Classes. Concept of Object and Classes, Methods, Parameters, Data Types, Field, Understand Class definition, Constructors, Assignment Statements, Control Statements, Object Interaction. Creating Cooperating Object, Modularization Abstraction, Encapsulation, Object oriented Design. Object Type and Primitive Type, Grouping Objects, Collections, Array List, Array, Loops Iterator Objects, Class Libraries. More sophisticated behavior, Array List, Array List, Random, Interface and Implementation. Hash Map, Hash Set Java Packages and Imports, Tokenizing String, Writing Class documentation Improving structure with inheritance, Inheritance, Inheritance, Sub Type Substitution, Polymorphic variables, Casting types, wrapper classes and autoboxing. More about inheritance, Static and Dynamic type, Method polymorphism, Overriding inherited methods, Dynamic method lookup Protected access, Further Abstraction techniques, Abstract Classes, Multiple Inheritance, Interfaces, Polymorphism with Interfaces, Multithreading, Building Graphical User Interface, GUI principle, Components, Event Handling, Inner and Anonymous Classes, Layout Manager, Handling errors, Exception handling and throwing, Try, Catch, Final Construct, Error reporting.

**Course Goals**

**Goal-1 Introduction.**

Objective-1 Overview of object-orientation

Objective-2 Overview of quality of software systems

Objective-3 Design and Implementation

**Goal-2 Object and Classes**

Objective-1 Concept of Object and Classes

Objective-2 OOP Model

Objective-3 Methods, Parameters

Objective-4 Data Types, Fields

Objective-5 Object Type & Primitive Type

**Goal-3 Understand Class definition**

Objective-1 Constructors

Objective-2 Assignment Statements

Objective-3 Control Statements

**Object-4 Object Interaction**

Objective-1 Creating Cooperating Objects (Object Interaction)

Objective-2 Modularization

Objective-3 Abstraction

Objective-4 Encapsulation

**Goal-5 Grouping Objects.**

Objective-1 Collections, Array Lists, Linked List

Objective-2 Array List, Random

Objective-3 Hash Map, Hash Set

Objective-4 Foreach Loop

Objective-5 Iterator Objects

Objective-6 Class Libraries

**Goal-6 More sophisticated behavior**

Objective-1 Interface and Implementation

Objective-2 Java Packages and Import

Objective-3 Tokenizing String

Objective-4 Writing Class documentation

**Goal-7 Improving structure with inheritance.**

Objective- 1 Inheritance

Objective-2 Sub typing

Objective-3 Sub Type Substitution

Objective-4 Polymorphic variables

Objective-5 Casting types

Objective-6 Wrapper classes and auto boxing

Objective-7 Shallow Copy & Deep Copy

**Goal-8 More bout inheritance.**

Objective-1 Static and Dynamic type

Objective-2 Method polymorphism

Objective-3 Overriding inherited methods

Objective-4 Dynamic method lookup

Objective-5 Protected access

**Goal-9 Further Abstraction techniques.**

Objective-1 Abstract Classes

Objective-2 Interfaces

Objective-3 Multiple Inheritance

Objective-4 Polymorphism with Interfaces

**Goal-10 Threading**

Objective-1 Threads and their importance

Objective-2 Life cycle of a Thread

Objective-3 Threads Priorities

Objective-4 Creating threads by implementing Runnable Interface

Objective-5 Creating Thread by extending Thread class

Objective-6 Thread Method

**Goal-11 Handling errors.**

Objective-1 Exceptions handling and throwing

Objective-2 Try, Catch, Final Construct

Objective-3 Error reporting

**Goal-12 Building Graphical User Interface.**

Objective-1 GUI principle

Objective-2 Components

Objective-3 Event Handling

Objective-4 Inner and Anonymous Classes

Objective-5 Layout Manager

Optional Topic : Java Database Conncectivity

**Reference Books**

1. C++ How to Program, 8/E (Harvey & Paul) Deitel and Deitel ISBN: 978-0132662369 Publisher: Prentice Hall.
2. Java How to Program, 9/E (Havey & Paul) Deitel & Deitel ISBN: 978-0132575669, Publisher: Prentice Hall
3. Object First with Java – A Practical Introduction Using BlueJ 5/E (David J. Barnes & Michael Kölling) ISBN: 978-013-249266-9 Publisher: Prentice Hall