OBJECT ORIENTED DESIGN

1. Introduction

Credits: 3-0-0

2. Course Outline

UNIT - I: Object Oriented Fundamentals and Modeling
Need for OOP paradigm, What is object orientation and OO Development, Modelling, Abstraction, Three models of OOD, Object and class concepts, Links and Association Concepts, Generalization and Inheritance, N-ary associations, Aggregation, Abstract classes, multiple inheritance, metadata, Reification, Constraints, Derived data, packages.

UNIT - II: Java Basics
History of Java, java data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT - III: State Modelling and Interaction Modelling
Events, states, Transitions and Conditions, State Diagram, Nested state diagram, Concurrency

Use-Case model, Sequence model, Activity model, procedural sequence model, Relation between class, state model and interaction model

UNIT - IV:
Hierarchical abstractions, Generalization and Aggregation, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class
Exception handling in Java:
Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util

UNIT - V: System Design, Class Design and Implementation Modelling
Overview of system design, performance estimation, reuse plan, Subsystems, Management of data storage and global resources, software control strategy and boundary conditions
Overview of class design, Realizing use-cases, designing algorithms, refactoring and design optimization, Overview of implementation, fine tuning of classes, generalization, and realizing associations

3. Reading Material

Text Books

1. Java: The complete reference, Herbert Schildt, McGrawhill
2. Understanding OOP with Java, T. Budd, Pearson Education
3. Object Oriented Modelling and Design with UML, 2nd edition, Michael Blaha and James Rambaugh, Eastern Economy Edition