Object-Oriented Programming in Java

EG2203CT

Year: II **Total: 8 hours /week**

Part: II **Lecture: 4 hours/week**

Tutorial: 1 hour/week

Practical: hours/week

Lab: 3 hours/week

Course description:

The purpose of this course is to introduce the concepts Object Oriented Programming using Java programming including introduction, basic structure, classes and objects, inheritance, interfaces, packages, exception handling, and multithreading. At the end, students will be able to write computer programs using different features of Java Programming.

Course objectives:

After completion of this course students will be able to:

1. Implement the concept of Object-Oriented Programming.
2. Implement object, class, inheritance, polymorphism, encapsulation and data abstraction in programming.
3. Implement the problems in Java using Object-Oriented approach.

Course Contents:

Theory

Unit 1. Object-Oriented Programming [3 Hrs.]

1.1. Procedure Oriented Programming
1.2. Object-Oriented Programming
1.3. Procedure Oriented versus Object Oriented Programming
1.4. OOP principles
1.5. Advantages and Disadvantages of OOP

Unit 2. Introduction to Java [2 Hrs.]

2.1. Java as a Programming Platform
2.2. History of Java
2.3. Java Buzzwords
2.4. Java Virtual Machine

Unit 3. Fundamental Programming Structures [10 Hrs.]

3.1. Whitespace, Identifiers, Literals, Comments, Separators and Keywords
3.2. Data Types and Conversion
3.3. Variables
3.4. Constants
3.5. Operators
3.6. Strings
3.7. Control Structures
3.8. Loop
3.9. Methods
3.10. Arrays

Unit 4. Classes and Objects [10 Hrs.]

4.1. Defining Class
4.2. Adding Variables
4.3. Adding Methods

4.4. Static Variables, Methods, Blocks and Class
4.5. Access Control
4.6. Method Parameters
4.7. Creating Objects
4.8. Accessing class members
4.9. Setters and Getters
4.10. Constructors
4.11. Overloading Methods
4.12. Call by value, Call by reference
4.13. this keyword
4.14. final modifier
4.15. Nested Classes
4.16. Wrapper Classes in Java
4.17. Garbage Collection

Unit 5. Inheritance [8 Hrs.]

5.1. Introduction
5.2. Types of Inheritance
5.3. Method Overriding
5.4. Using Super keyword
5.5. Execution of Constructors in Multilevel Inheritance
5.6. Abstract Classes and Methods

Unit 6. Interface and package [8 Hrs.]

6.1. Defining Interfaces
6.2. Extending Interfaces
6.3. Implementing Interfaces
6.4. Accessing Interface Variables
6.5. Introduction to java Packages
6.6. Creating a Package and naming convention
6.7. Using Packages

Unit 7. Exception Handling [6 Hrs.]

7.1. Exceptions and its types
7.2. Exception handling fundamentals (try, catch, throw, throws and finally)
7.3. Using try and catch
7.4. Using throw and throws

Unit 8. Multithreading [6 Hrs.]

8.1. Introduction of Thread
8.2. Creating a Thread
8.3. Thread Priorities
8.4. Life cycle of a Thread (Thread states)

Unit 9. I/O [7 Hrs.]

9.1. Java.io package
9.2. Byte Stream and Character Stream classes
9.3. Using FileInputStream and FileOutputStream classes
9.4. Using FileReader and FileWriter Classes

Practical: **[45 Hrs.]**

1. Install Java Tools.
2. Create and demonstrate programs using control statements and array.
3. Create and demonstrate programs using class, object, methods and constructor.
4. Create and demonstrate programs using inheritance.
5. Create and demonstrate programs using method overloading and method overriding.
6. Create and import Java Packages and Sub-Packages.
7. Create and demonstrate programs using interface.
8. Create and demonstrate programs for exception handling.
9. Create and demonstrate programs for concept of multithreading.
10. Create and demonstrate I/O programs.

Final written exam evaluation scheme			
Unit	**Title**	**Hours**	**Marks Distribution***
1	Object-Oriented Programming	3	4
2	Introduction to Java	2	3
3	Fundamental Programming Structures	10	13
4	Classes and Objects	10	13
5	Inheritance	8	11
6	Interface and package	8	11
7	Exception Handling	6	8
8	Multithreading	6	8
9	I/O and Java Applets	7	9
	Total	**60**	**80**

* There may be minor deviation in marks distribution.

References:

1. Balaguruswamy, E. (2014). *Programming with JAVA - A Primer: Third Edition.* McGraw-Hill Professionals.
2. David Holmes, K. A. (2005). *THE Java™ Programming Language, Fourth Edition.* Addison-Wesley Professional.
3. Horstmann, C. S. (2018). *Core Java Volume I--Fundamentals.* Pearson.
4. M. T. SOMASHEKARA, D. S. (2017). *OBJECT ORIENTED PROGRAMMING WITH JAVA.* PHI Learning Pvt. Ltd.
5. Mohan, P. (2013). *Fundamentals of Object-Oriented Programming in Java.* CreateSpace Independent Publishing Platform.