Semester I

Course Code: IT-11
Course Name: Java Programming

Credit Scheme			Evaluation Scheme				
Lecture	Practical	Credit	Internal			External	Total
			Written	Practical	Tutorial		
3 Hrs./Week	-	3	25	-	-	50	75

Course Description:

Prerequisite:

Knowledge of programming structures like decision flows, loops, etc.

Course Objectives:

1. To familiarize students with the concepts of OOPs.
2. To enable the students to understand the core principles of the Java Language and use AWT tools to produce well designed, effective applications.
3. Students will be able to develop server-side applications with database handling using servlets, JSP, JDBC

Course Outcomes:

Student will be able to

CO1 Understand Basic Concepts of OOPs, Java, Inheritance, Package. (Understand)
CO2: Understand Exception handling, arrays and Strings and multi-threading in Java (Understand.)
CO3: Understand collection framework (Understand)
CO4: Develop GUI using Abstract Windows Toolkit (AWT) and event handling (Apply)
CO5: Develop Web application using JSP and Servlet, JDBC (Apply)

Course Structure:

Sr. No.	Topics Details	Weightage in %	No of Sessions
1	**1. Introduction -** 1.1 About Java 1.2 Flavours of Java 1.3 Java Installation 1.4 Java Program Development Environment	3	2

	Extra reading: docs oracle docs		
2	**2. Object Oriented Programming** 2.1 Class Fundamentals 2.2 Object & Object reference 2.3 Object Life time & Garbage Collection 2.4 Creating and Operating Objects 2.5 Constructor & initialization code block 2.6 Access Control, Modifiers, Use of Modifiers with Classes & Methods. 2.7 Nested, Inner Class & Anonymous Classes, Abstract Class & Interfaces 2.8 Methods, Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, Dealing with Static Members, Finalize () Method, Native Method. 2.9 Use of "this "reference, 2.10 Design of Accessors and Mutator Methods 2.11 Cloning Objects, shallow and deep cloning 2.12 Generic Class Types. Extra Reading : OCA Java Programmer :I Exam Kathy Sierra	8	3
3	**3. Extending Classes and Inheritance** 3.1 Use and Benefits of Inheritance in OOP 3.2 Types of Inheritance in Java 3.3 Inheriting Data members and Methods 3.4 Role of Constructors in inheritance 3.5 Overriding Super Class Methods, Use of "super" 3.6 Polymorphism in inheritance 3.7 Type Compatibility and Conversion 3.8 Implementing interfaces Extra Reading : Understanding and practicing above concept in depth - OCA Java Programmer :I Exam Kathy Sierra	6	3
4	**4. Package** 4.1 Organizing Classes and Interfaces in Packages 4.2 Package as Access Protection 4.3 Defining Package 4.4 CLASSPATH Setting for Packages 4.5 Making JAR Files for Library Packages 4.6 Import and Static Import 4.7 Naming Convention for Packages.	3	2

	Extra Reading : Oracle Javase tutorial		
5	5. **Exception Handling** 5.1 The Idea behind Exception 5.2 Exceptions & Errors 5.3 Types of Exception 5.4 Control Flow in Exceptions 5.5 JVM reaction to Exceptions 5.6 Use of try, catch, finally, throw, throws in Exception Handling 5.7 In-built and User Defined Exceptions Checked and Un-Checked Exceptions Extra Reading : Oracle Javase tutorial	6	3
6	6. **Array & String**: 6.1 Defining an Array **6.2** Initializing & Accessing Array **6.3** Multi –Dimensional Array **6.4** Operation on String, Mutable & Immutable String **6.5** Using Collection Bases Loop for String, Tokenizing a String **6.6** Creating Strings using StringBuffer, String Builder Extra Reading : Java arrays, tokenizer applications– Jenkov Tutorials	4	2
7	7. **Thread** 7.1 Understanding Threads **7.2** Needs of Multi-Threaded Programming **7.3** Thread Life-Cycle **7.4** Thread Priorities **7.5** Synchronizing Threads **7.6** Inter Communication of Threads **7.7** Critical Factor in Thread –Deadlock Extra Reading : Animation Using Thread	6	3
8	8. **A Collection of Useful Classes** 8.1 Utility Methods for Arrays **8.2** Observable and Observer Objects, **8.3** Date & Times, **8.4** Using Scanner **8.5** Regular Expression, **8.6** Input/output Operation in Java (java.io Package) **8.7** Streams and the new I/O Capabilities 8.7.1 Understanding Streams **8.7.2** The Classes for Input and Output **8.7.3** The Standard Streams **8.8** Working with File Object	6	3

	8.8.1 File I/O Basics, 8.8.2 Reading and Writing to Files 8.8.3 Buffer and Buffer Management 8.8.4 Read/Write Operations with File Channel **8.9** Serializing Objects Extra Reading : regex – Pattern matching, split examples, reading and writing Character Stream, Byte stream and Objects in java files.		
9.	**9. UI Programming** **9.1** Designing Graphical User Interfaces in Java, 9.2 Components and Containers, 9.3 Basics of Components 9.4 Using Containers 9.5 Layout Managers, 9.6 AWT Components 9.7 Adding a Menu to Window 9.8 Extending GUI Features Using Swing Components Extra Reading : Using Swing toolkit GUI –oracle java tutorial	12	5
10	**10. Event Handling** 10.1 Event-Driven Programming in Java **10.2** Event- Handling Process **10.3** Event Handling Mechanism **10.4** The Delegation Model of Event Handling **10.5** Event Classes, Event Sources, Event Listeners **10.6** Adapter Classes as Helper Classes in Event Handling. Extra Reading : Hierarchy of Event Classes, Event Sources, Event Listeners- Oracle java docs	10	4
11	**11. The Collection Framework** 11.1 Introduction to Java Frameworks **11.2** Collections of Objects **11.3** Collection Types, Sets, Sequence, Map **11.4** Understanding Hashing **11.5** Use of ArrayList & Vector **11.6** Java Utilities (java.util Package) Extra Reading : searching, sorting, insertion, manipulation, deletion of data using Java Collections	10	4
12	**12. Database Programming using JDBC** 12.1 Introduction to JDBC **12.2** JDBC Drivers & Architecture **12.3** CURD operation Using JDBC	10	4

	12.4 Connecting to non-conventional databases Extra Reading: List of JDBC Drivers and Jars, Statement, Prepared Statement and Callable Statement.		
13	**13. Java Server Technologies** 13.1 Servlet Web Application Basics, **13.2** Architecture and challenges of Web Application **13.3** Introduction to servlet **13.4** Introduction to JSP **13.5** Servlet life cycle **13.6** Developing and Deploying Servlets, Exploring Deployment Descriptor (web.xml) **13.7** Handling Request and Response. Java Extra Reading : Session handling 4 methods, RequestDispatcher ,JSP Tags, JSP Implicit objects, Generic Servlet	16	7
	Total:	**100**	**45**

Course References:

Recommended Books:

Text Books:

1. Java Complete Reference Schildt Herbert, TMH.
2. Java Fundamentals (SIE), Schildt Herbert, TMH
3. The Complete Reference JSP, Phil Hanna, TMH
4. JDBC, Servlet and JSP, Black Book, Santosh Kumar K. Dremtech publication

Reference Books:

1. Head First Servlets and JSP, 2nd Edition by Bert Bates, Bryan Basham, Kathy Sierra
2. OCJP Oracle Certified Programmer for Java Study Guide by Kathy Sierra and Bert Bates.
3. A Programmer's Guide to Java OCJP Certification (A Comprehensive Primer) by Khalid A. Mughal and Rolf W. Rasmussen.
4. Java Server Programming Java Ee&(J2EE 1.7), Black Book, Wiley publications

Recommended Learning Material:

1. www.javatpoint.com
2. www.oracle.com
3. www.tutorialspoint.com
4. www.geeksforgeeks.org/java

Recommended Certification:

1. OCA- Oracle Certified Associate