**JAVA PROGRAMMING**

**CS 124 3 - 3 - 4**

**Course Objectives:** At the end of the program the student must be able to

* Understand the basic structure of a Java program.
* Analyze the basic java programming paradigms.
* Identify the extended features of operators, control statements and arrays.
* Identify and Use Object Oriented Programming concepts in Java.
* To prepare them to learn advanced Java Programming.

1. INTRODUCTION:

The Java Language, The Key Attributes of Object Oriented Programming, The Java Development Kit, A First Simple Program, Programming Basics, The Java Keywords, Identifiers in Java, The Java Class Libraries.

(Chapter 1 Sections 1.4 - 1.17 of Text Book 1) (2hrs)

2. LANGUAGE BASICS:

Java’s Primitive Types, Literals, Variables, Scope and Lifetime of Variables, Operators and Operator Precedence, Expressions, Input, Control Structures, Arrays and Strings.

(Chapter 2 Sections 2.2-2.15; Chapter 3 Sections 3.1-3.16; Chapter 5 Sections 5.1-5.10 of Text Book 1) (2 hrs)

3. INRODUCTION TO CLASSES, OBJECTS AND METHODS:

Class Fundamentals, Creating Objects, Reference Variables and Assignment, Methods, Returning from a method, Returning a Value, Using Parameters, Constructors, Parameterized Constructors, The new operator, Garbage Collection and Finalizers, this keyword, Controlling Access to Class Members, Pass Objects to Methods, Arguments Passing, Returning Objects, Method Overloading, Overloading Constructors, Understanding static, Nested and Inner Classes, Variable Length Arguments.

(Chapter 4 Sections 4.1 – 4.11; Chapter 6 Sections 6.1-6.10 of Text Book1)  (8 hrs)

4. INHERITANCE:

Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, User Super to Call Superclass Constructors and Access Superclass Members, Creating Multilevel Hierarchy, Order of execution of Constructors, Superclass References and Subclass Objects, Method Overriding and Polymorphism, Using Abstract Classes, Using Final, The Object Class.

(Chapter 7 Sections 7.1– 7.14 of Text Book1) (6 hrs)

5. INTERFACES:

Interface Fundamentals, Creating and Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Extending Interfaces, Nested Interfaces.

(Chapter 8 Sections 8.1 – 8.8 of Text Book1) (3 hrs)

6. PACKAGES:

Package Fundamentals Packages and Member Access, Importing Packages, Static Import

(Chapter 9 Sections 9.1– 9.4 of Text Book1) (3 hrs)

7. EXCEPTION HANDLING:

Exception Hierarchy, Exception Handling Fundaments, Consequences of an Uncaught Exception, Handling Errors through Exceptions, Using Multiple catch Clauses, Nesting try blocks, Throwing an Exception, Closer look at Throwable, Using finally, Using throws, Built-in Exceptions, Creating Exception Subclasses.

(Chapter 10 Sections 10.1 – 10.14 of Text Book1) (3 hrs)

8. MULTITHREADED PROGRAMMING:

Multithreading Fundamentals, The Thread Class and Runnable Interface, Creating a Thread and Multiple Threads, Determining when a Thread Ends, Thread Priorities, Synchronization, Using Synchronized Methods, The synchronized statement, Thread Communication, Suspending, Resuming and Stopping Threads.

(Chapter 12 Sections 12.1 – 12.11 of Text Book1) (5 hrs)

9. GENERICS:

Generic Fundamentals, Bounded Types, Using Wildcard Arguments, Bounded Wildcards, Generic Methods, Constructors, Class Hierarchies, and Interfaces, Raw Types and Legacy Code, Type Interference with Diamond Operator, Erasure, Ambiguity Errors, Some Generic Restrictions.

(Chapter 14 Sections 14.1 – 14.13 of Text Book1) (5 hrs)

10. STRING HANDLING

String Fundamentals, String Constructors, Three String-Related Language Features, The length() Method, String Manipulation Methods.

(Chapter 22Sections22.1 – 22.9 of Text Book1) (3 hrs)

11. USING INPUT OUTPUT

Char and Byte stream classes, Predefined streams, Console i/o using streams, Reading and Writing Files using Bytestreams and Charstreams.File, FilenameFilter, Random Access File class.

(Chapter 11 Sections 11.2 – 11.7,11.10-11.12 of Text Book1) (3hrs)

12. APPLETS

Applet basics,Skeleton,Initialization,Termination,Architecture,Using status window,Passing passing paramaters.

(Chapter 15 Sections 15.1-15.7 of Textbook1) (2hrs)

13.SWINGS AND EVENT HANDLING

The origins and design philosophy of swings, components and containers,LayoutManagers,Eventhandling,using pushbutton,JTextField,Anonymous inner classes to handle events.

(Chapter 17 Sections 17.1-17.8 of Textbook 1) (3hrs)

**Text Books:**

1. Herbert Schildt and Dale Skrien, “*Java Fundamentals – A Comprehensive Introduction*”, McGrawHill, First Edition, 2013.

**References:**

1. Herbert Schildt, “*The Complete Reference JAVA 2*”, Tata McGrawHill, 8th Edition 2011.
2. Dietel and Dietel, “*Java How to Program*”, 9th Edition, Prentice Hall India, 2012.
3. Steven Holzner, “*Java 2 programming BlackBook*”,DreamTech,India 2005.

Java Programming [Practical]

1. Experiments on Control statements and arrays
2. Experiments on Classes and methods
3. Experiments on Classes and methods  (continued)
4. Experiments on Inheritance and Packages
5. Experiments on Interfaces, Exception Handling.
6. Experiments on Threads
7. Experiments on Threads (continued)
8. Experiments on Input/Output
9. Experiments on Applets and Event Handling
10. Experiments on Generics
11. Experiments on String handling
12. Experiments on Programs involving Swings

**Reference:**

1. Herbert Schildt , “The Complete Reference Java ”, Seventh Edition