

# CSE406:ADVANCED JAVA PROGRAMMING

L:3 T:0 P:2 Credits:4

**Course Outcomes:** Through this course students should be able to

CO1 :: describe applications that use builder pattern and the map-reduce framework

CO2 :: explain high-performing multi-threaded applications

CO3 :: develop Java applications with the latest JDK Technology and GUI features

CO4 :: connect the applications with Database using JDBC

CO5 :: predict the use of Date Time API classes and methods in Java Applications

CO6 :: use Lambda Expression Concurrency features

## Unit I

**Collections Streams, and Filters** : Describing the Builder pattern, Iterating through a collection using lambda syntax, Describing the Stream interface, Filtering a collection using lambda expressions, Chaining multiple methods together, Defining pipelines in terms of lambdas and collections, Describing how to make a stream pipeline execute in parallel, Defining reduction, Calculating a value using reduce, Describing the process for decomposing and then merging work

**Lambda Operations** : Extracting data from an object using map, Describing the types of stream operations, Describing the Optional class, Describing lazy processing, Sorting a stream, Saving results to a collection using the collect method, Grouping and partition data using the Collectors class, Program to implement Lambda operations

## Unit II

**GUI** : Introduction to swing, JFrame & JPanel, Swing components, Layout managers, Color Class, Font Class, Graphics class, Programs to create Graphical User Interface

**Event Handling** : Event delegation model, Event and Event source, Event listener interfaces, Registrations and handling events, Event class – mouse events, key events, Anonymous class listeners, Listener Interface Adapter

## Unit III

**File I/O (NIO.2)** : Using the Path interface to operate on file and directory paths, Using the Files class to check, delete, copy, or move a file or directory, Using Stream API with NIO2

**Database Applications with JDBC** : Defining the layout of the JDBC API, Connecting to a database by using a JDBC driver, Submitting queries and get results from the database, Specifying JDBC driver information externally, Performing CRUD operations using the JDBC API

## Unit IV

**JSP** : Lifecycle of a JSP Page, The Directory structure of JSP, The JSP API, JSP Scripting elements: scriptlet tag, expression tag, declaration tag, JSP Implicit Objects, JSP Action Tags

## Unit V

**Java Date/Time API** : Creating and manage date-based events, Creating and manage time-based events, Combining date and time into a single object, Working with dates and times across time zones, Defining and create timestamps, periods and durations, Applying formatting to local and zoned dates and times

## Unit VI

**Concurrency** : Describing operating system task scheduling, Creating worker threads using Runnable and Callable, Using an ExecutorService to concurrently execute tasks, RecursiveTask

**Localization** : Describing the advantages of localizing an application, Read and set the locale by using the Locale object, Building a resource bundle for each locale, Calling a resource bundle from an application

**Multi-Threading** : Overview of multi threading, Thread life cycle, Creating tasks and threads, Thread class and Runnable interface

## List of Practicals / Experiments:

### Concurrency Practical

- Program to implement Executor service and Fork-Join Framework

**Multi-Threading Practical**

- Program to implement multi-threading

**Localization Practical**

- Program to implement Internationalization

**Java Date/Time Practical**

- Program to implement Date-Time API

**JSP Practical**

- Program to implement JSP API
- Program to create web-services

**File Input output Practical**

- Program to implement File I/O

**Database Practical**

- Program to implement JDBC API

**Event Handling Practical**

- Program to handle events using listener interfaces
- Program to handle events using Adapter classes

**GUI Practical**

- Programs to create Graphical User Interface

**Lambda Practical**

- Program to implement Lambda operations

**Collection Practical**

- Program to implement Streams API
- Program to implement Collection Streams

**Text Books:**

1. JAVA THE COMPLETE REFERENCE by HERBERTZ SCHILDT, MCGRAW HILL EDUCATION

**References:**

1. INTRODUCTION TO JAVA: COMPREHENSIVE EDITION by DR. Y. DANIEL LIANG, PEARSON
2. ADVANCED JAVA TECHNOLOGY by PROF. M.T. SAVALIYA, DREAMTECH PRESS
3. JAVA: THE COMPLETE REFERENCE by HERBERT SCHILDT, Tata McGraw Hill, India
4. CORE JAVA AN INTEGRATED APPROCH by DR. R NAGESWARA RAO, DREAMTECH PRESS
5. PROGRAMMING IN JAVA by SACHIN MALHOTRA AND SAURABH CHOUDHARY, Oxford Higher Education