

*Suggested Teaching Guidelines for*  
**Java Technologies-I (Core Java)–PG-DAC August 2019**

**Duration:** 36 classroom hours +34 lab hours ( 70hrs)

**Objective:** To introduce the student to Core Java Technologies

**Prerequisites:** Knowledge of object oriented programming

**Evaluation method:** Theory exam– 40% weightage  
Lab exam – 40% weightage  
Internal exam– 20% weightage

**List of Books / Other training material**

**Text Book:**

1. Core and Advanced Java Black Book Black by Dreamtech Press

**Reference:**

1. Java 8 Programming Black Book by Dreamtech Press
2. Core Java : Fundamentals - Volume 1 Gary Cornell, Cay S. Horstmann/ Pearson
3. Programming in Java by Sachin Malhotra, Saurabh Choudhary / Oxford University Press
4. Core Java : Advanced Features - Volume 2 Gary Cornell, Cay S. Horstmann/ Pearson
5. Beginning Java 2 by Ivor Horton; Wrox Publication
6. The Complete Reference Java Eight Edition, Herbert Schidt/ TMH
7. Object-Oriented Analysis and Design with applications by Booch
8. Core Java 8 for Beginners by Sharanam Shah, Vaishali Shah / Shroff Publishers & Distributors
9. Murach's Java Programming 4th edition by Joel Murach / Shroff Publishers & Distributors
10. Advanced Java programming by Uttam K Roy / Oxford University press
11. Sun Certified Enterprise Architect For Java EE Study Guide by Cade, 2nd Edition (Paperback)
12. Programming in Java by Sachin Malhotra, Saurabh Choudhary / Oxford University Press
13. **Professional Java EE Design Patterns by Murat Yener, Alex Theedom, Reza Rahman (Paperback)**

**Session 1:**

**Lecture**

- Java 8 Basics :Overview of Java, Features of Java, Scope of variables
- JDK and its usage (Java Compiler, Java Runtime, Java Debugger, Java doc)
- Working with Data Types: Structure of a Java Class, Importing Packages, Difference between object reference variables and primitive variables, how to read or write to object fields)

**Session 2:**

**Lecture**

- Object's lifecycle(creation, reassignment, garbage collection: new, finalize)
- Wrapper classes (Boolean, Double and Integer)

*Suggested Teaching Guidelines for*  
**Java Technologies-I (Core Java)–PG-DAC August 2019**

- Operators (Unary, Binary, Arithmetic, Assignment, Compound, Relational, Logical, Equality) and Control Statements (if, if-else, for, while, switch, do-while, break and continue, ternary constructs)

**Session 3:****Lecture**

- Packages and classpath
- Arrays
- Understanding of String Class, StringBuilder Class, StringBuffer class
- Methods and Encapsulation: Methods, Access Modifiers, Method Overloading, Passing Data, Creating Constructors, Immutable Classes

**Assignment – Lab:**

Get yourself acquainted with java environment. Build a class Emp, which contains details about the employee and compile and run its instance

**Assignment – Reading:**

Study the book Java FAQ

**Assignment – Tutorial:**

Compare syntactical similarities and dissimilarities between Java and C++

**Session 4:****Lecture**

- Class Inheritance, Abstract Classes, Inner Classes, Interface and Implementation classes.
- Understanding Polymorphism: Object vs Reference, Object Casting, Virtual Methods, Method Overriding

**Assignment – Lab:**

Create an inner class for a manager, which contains information about the manager. Use the appropriate interfaces. Create an anonymous inner class for Tech. Members using the Session one assignment

**Session 5:****Lecture**

- Exception-Handling: Basics, Role of Exceptions, Types
- Using try and catch, Multiple Catch, Nested try (throw, throws, finally)
- Built-in Exceptions, Runtime Exceptions Checked Exceptions, Errors
- Creating own Exception Subclasses

**Assignment – Lab:**

Create a user defined exception to check whether your employee exist in your data structure and using the catch and finally block. Redeem an appropriate solution.

**Session 6:****Lecture**

- Enumerations, Auto boxing, and Annotations

*Suggested Teaching Guidelines for*  
**Java Technologies-I (Core Java)–PG-DAC August 2019**

- Lambda Expressions
- Java 8 New Features

**Session 7 & 8:****Lecture**

- Java API: java.util, java.lang, java.math

**Assignment – Lab:**

Create an appropriate data structures to store your employee object and use the java.util.package properties.

**Session 9 & 10:****Lecture**

- Generics and Collections

**Assignment – Lab:**

1. Implement String class and util package
2. Using the collection framework define an appropriate interface to your above application

**Assignment – Lab:**

Create a user defined exception to check whether your employee exist in your data structure and using the catch and finally block. Redeem an appropriate solution.

**Session 11:****Lecture**

- Java NIO (NIO 2) Overview
- NIO classes: Fundamentals, Path Interfaces, Manage metadata of a file or directory,
- Byte Buffers & Channels
- UDP, TCP and IP
- Communication with TCP/IP Protocol

**Assignment – Lab:**

- Implement to Send File Contents (two way communication Java)
- A Simple Java TCP Server and TCP Client

**Session 12:****Lecture**

- Java Concurrency: Using threads in Java, Life cycle of thread
- Advantages and issues
- Thread class, thread groups
- The Runnable interface

**Session 13:****Lecture**

- Synchronization, Inter-Thread communication

*Suggested Teaching Guidelines for*  
**Java Technologies-I (Core Java)–PG-DAC August 2019**

- Executor Framework overview

**Assignment – Lab:**

Using Multi-Threading create concurrent java application , to write data to file in a thread safe manner.

Apply Thread safety to Collection Framework API classes

**Session: 14 & 15****Lecture**

- The java.io Package
- Files
- Byte Streams and Unicode Character Streams
- Persistence of objects
- Object Serialization Methods

**Assignment – Lab:**

Make your above Employee, manger classes objects persistent.

**Session: 16****Lecture: Reflection in Java**

- Java Reflection Classes, Methods, Getter Setters, Constructors, Annotations, generics, Arrays, Dynamic method invocation

**Assignment – Lab:**

Create a new array, whose size and component type are not known until runtime, and then modify the array's components

**Session: 17: Java Virtual Machine****Lecture**

- What is a Java Virtual Machine?
- The Lifetime of a Java Virtual Machine
- The Architecture of the Java Virtual Machine
- Java Mail
  - javax.mail.internet Class ContentType
  - Method
  - java.lang.String, getBaseType()
  - java.lang.String, getParameter(java.lang.String name)

**Assignment – Lab**

- Configuring JavaMail API and sending test mails
- Implement to send multiple mails, mails with attachments, calendar appointment etc.

*Suggested Teaching Guidelines for*  
**Java Technologies-I (Core Java)–PG-DAC August 2019**

**Session 18:**

**Lecture**

- Introduction of JDBC API
- JDBC Architecture
- JDBC Drivers
- Drivers, Connection, Statement , PreparedStatement and Result Set interfaces and their relationship to provider implementations
- Writing JDBC Application along with DAO & POJO Layers
- Stored Procedures and functions invocation