# Core Java Course Syllabus

## Object Oriented Programming Concepts — 60 Minutes

- Introduction
- OOP Concepts (Basic + Fundamental of OOP).
- Benefits of OOP Programming.

## Introduction to JAVA — 90 Minutes

- What is Java
- Features of Java.
- Advantages of Java.
- JDK, JVM architecture.
- Setting the class path.

## Java Installation — 120 Minutes

- Java Installation
- Eclipse Installation
- My First Java Program

## Sample Java Program — 60 Minutes

- Class
- Details about main method

## Data types, Variables and Operators — 60 Minutes

- Java Tokens, Alphabets (Character Set).
- Keywords, Java Reserved Keywords, Identifiers, Constants, Datatypes, Operators.

## Control-flow Statements — 60 Minutes

- Control-Flow Statements, Decision-Making Statements, Switch and IF else, nested–– if

## Conditional Statements — 120 Minutes

- Looping statements – while, for, do.. while and Break, Continue.

## . Classes and Objects — 60 Minutes

- What is Class, Declaring a class, Rules for Naming Class
- Creating an Object, new keyword.

## Exploring Methods — 120 Minutes

- Method Calling from main() method
- Return values from called method
- Significance of void, return keywords
- Argument Passing, Local Variable, Global Variable

## Polymorphism - Introduction — 120 Minutes

- Methods with different no. and type of arguments
- Introduction to Polymorphism
- Method Overloading – Compile Time Polymorphism

## Encapsulation - Introduction — 120 Minutes

- Create one more class in same package– Class 2
- Call methods present in Class 1 from Class 2
- Significance of Access Modifiers – private, public and default

## Encapsulation – Part 2 — 60 Minutes

- Create one more class in another package– Class 2
- Try to call methods present in Class 1 from Class 2
- Significance of Access Modifier – protected.

## Inheritance — 150 Minutes

- Need for Inheritance
- IS-A relationship
- Usage of extends keyword
- Simple, Multilevel and Hierarchical Inheritance
- Create child class in another package– Class 2
- Significance of Access Modifier – protected.

## Polymorphism – Method Overriding — 120 Minutes

- Method Overriding
- Type Casting
- super and this keywords

- super() and this() keywords

## Constructor — 120 Minutes

- What is Constructor
- How Constructor is being called
- Rules for Constructor
- Constructor Overloading

## Getting inputs at runtime — 60 Minutes

- Scanner Class and its methods
- Converting all their previous programs with Scanner Class

Expectation: Trainees should know the power of Reusability and various methods in Scanner Class.

## Arrays — 60 Minutes

- Need for Array
- Types of Arrays
- Array Declaration – Two Ways
- 2D, 3Dimension arrays
- Int array, char array, String array
- Converting all their previous programs with Scanner Class

Expectation: Trainees should understand the need for Arrays

## String — 120 Minutes

- String Class
- String declaration – two ways
- Heap Memory, String Constant Pool Memory
- Difference between String literal and String Object
- Difference between == operator and equals method
- toString() method, hashCode() method

## Abstraction – Introduction — 120 Minutes

- Details about abstract keyword
- Abstract Class
- Abstract Method
- Creating Object for abstract class not possible - Why
- Dynamic Binding / Late Binding
- Significance of static keyword

- Static abstract class not possible - How

## Inheritance – Interface — 90 Minutes

- What is Interface
- Difference between Abstract class and Interface
- Usage of implements keyword
- Interface, Sub Interface
- Dynamic Binding / Late Binding

## Exception Handling — 240 Minutes

- What is Exception
- Difference between Exception and Error
- Syntax for Exception Handling Mechanism.
- try Block, Catch Block, Exception , Checked Exceptions
- Catch Block (or) Multiple Catch.
- Throw, Throws, The finally Block,
- User Defined Exceptions.

## Utility Classes - Introduction — 60 Minutes

- Collection Framework
  - Collection Interfaces
  - The List Interface and its implementation classes
  - The Set Interface and its implementation classes
  - The Queue Interface and its implementation classes
- Maps
  - Map and its class
  - SortedMap and its classes
  - HashTable

## Utility Classes - List Interface — 120 Minutes

- ArrayList and its methods
- LinkedList and its methods
- Difference between ArrayList and LinkedList
- Iterator Methods

## Utility Classes - List Interface – Logical Programs — 120 Minutes

- Getting input from user and Sorting the arraylist

- Searching in ArrayList
- Replacing element in ArrayList

## Utility Classes - Map Interface – Logical Programs 60 Minutes

- Find duplicate character in a given String using HashMap
- Find unique characters in a given String using HashMap
- Find count of characters in a given String using HashMap

## Generics 30 Minutes

- Need for Generics
- Simple Generics
- Subtyping in generics

## Packages 30 Minutes

- Predefined Packages
- Userdefined Packages

## Multithreading 120 Minutes

- Threaded Application
- Thread states
- Runnable interface and Thread class
- Thread Priority
- Interrupting Threads (sleep(), join())
- Synchronization
- Intro. About Inter thread communication

## SQL Basics 120 Minutes

- MySQL Installation
- SQL Basic Queries
  - DDL
  - DML

## Introduction to JDBC 180 Minutes

- The JDBC Connectivity Model
- Types of Jdbc Drivers
- Database Programming (with MYSQL)
- Connecting to the Database
- Creating a SQL Query
- Getting the Results using ResultSet Interface
- Statement and PreparedStatement
- Commit and Autocommit, BatchUpdates
- ResultSetMetaData and DataBaseMetaData

## Logical Programs 40 Hours

1) Variables - Why?
- Swapping two variables without using third variable
2) Conditional Statements - if else else if
3) Control Flow Statements - while, do...while, for loop
   1 printing 1 - 5 times
   2 printing 12345
   3 printing 246810
   4 printing 13579
   6 printing 1 11 121
   7 printing 1 8 27 64
   8 printing 1 4 9 16 25 36 49 64 81 100
   9 printing 1 4 27 256
   10 printing 1 2 4 7 11 16
   11 printing only multiples of 3 and 5
   12 printing only multiples of 3 or 5
   13 printing  1*2 2*3 3*4 4*5 5*6
   16 Addition of first n numbers
   17 Factorial
   18 printing 5! 4! 3! 2! 1!
   19 printing 1*10 2*9 3*8 4*7
   20 Square root of a given number
   21 Fibonacci Series
   22 Fibonacci Series using two variables
   5  printing 13579246810
   14 Finding prime no.
   15 Finding first 20 prime no.
   23 Printing the number in reverse order
   24 Reverse a number
   25 Palindrome
   26 Smallest Divisor of an integer
   27 Greatest Common Divisor of two integers
   28 Least Common Multiple of given numbers
   29 Decimal to Binary
   30 Binary to Decimal
   31 Perfect Number
   32 Armstrong Number
   33 number is multiple of 3 without using / and % operators
   34 no. of digits
   35 Strong number
   36 Neon number
   37 Spy number
   38 Prime no.s in a fibonacci series

Arrays:
1) Array Declaration
2) Printing Array

3) Printing in reverse order
26) Reverse an array
4) Linear Search
5) Finding index of given number
6) Removing given number from an array
7) Placing given number in last index of given array
8) how many times a given element is present
13) Finding count of duplicate elements in a given array
14) Finding addition of odd index numbers in a given array
15) Moving all elements towards left in a given array
16) Moving all elements towards left twice in a given array
17) Moving all elements towards right in a given array
18) Moving all elements towards right twice in a given array
19) Copying the given array to another array in reverse order
20) Addition of two integer arrays
9) Finding biggest no. in given array
10) Finding smallest no. in given array
11) Finding first two biggest numbers in a given array
12) Finding first two smallest numbers in a given array
21) Finding only negative numbers in given array
22) Copying only the negative numbers in given array - to another array
23) Copying only the odd indexed numbers in given array - to another array
24) Printing values between adjacent two elements in a given array
25) Removing all the duplicate elements in a given array

Searching, Sorting
1) Binary Search
2) Bubble Sort
3) Insertion Sort
4) Merge Sort
5) Pattern Programs - 16 programs minimum

String:
2) String Introduction
3) String class important methods
4) count of one character in a given String
5) Count of vowels in a given String
6) Printing only the numbers present in a String
7) Count of each character in a given String
8) Finding duplicate characters in a given String
9) count of total number of occurrences of a given char. in a string without using loop
10) Reversing a given String
11) Palindrome
12) Convert String to charArray
13) Convert String to Integer
14) Convert Char. Array to String

15) String in immutable
16) String comparison
17) Count of words in given String
18) Change only the first letter of a given String to upper case
19) Change upper case to Lower case in a given String
20) Two Strings are anagram or not
21) Find first non repeated character of a given String
22) Find the char. which occurred the highest times in a given String
23) Sort elements in Dictionary Order (Lexicographical)
24) Find last non repeated character in a given String
25) finding if adjacent characters are same and printing only those in a given array

### Recursion

- Display no.
- Sum of Natural numbers
- Sum of digits
- Factorial
- Fibonacci
- power of no.
- Decimal to Binary
- String Reverse
- Find GCD
- Binary Search
- Reverse words in a String

### Collection:

- Comparable, Comparator Interface
- Adding numbers in ArrayList until presses ‘stop’ and find the max. program
- Adding User defined Objects in ArrayList
    - Sorting, Searching them based on their attributes
- Adding User defined Objects in HashMap
    - Sorting, Searching them based on their attributes
- Significance of toString(), hashCode() methods

## Important Interview Questions:

Difference between - OOPs, List Interview Questions

1) Difference between =, == operator
2) Difference between ==, equals() method
3) Difference between Abstract class and final class
4) Difference between abstract class and interface
5) Difference between default and protected
6) Difference between static and final
7) Difference between instance and static

8) Difference between global and local variables
9) Difference between Method Overloading and Method Overriding
10) Difference between normal class and abstract class
11) Difference between Encapsulation and Abstraction
12) Difference between catch and finally
13) Difference between equals and compare methods
14) Difference between Error and Exception
15) Difference between Unchecked and Checked Exception
16) Difference between throw and throws
17) Difference between Array and ArrayList
18) Difference between finally and final
19) Difference between List and Set
20) Difference between ArrayList and LinkedList
21) Difference between method and Constructor
22) Difference between Collection and Collections
23) Difference between this and super
24) Difference between this and super
25) Difference between this() and super()
26) Difference between addFirst and OfferFirst methods in LinkedList
27) Difference between offer() and OfferLast methods in LinkedList
28)Difference between HashSet and LinkedHashSet
29) Difference between HashSet and TreeSet
30) Difference between add and addAll methods
31) Difference between Map and Set
32) Difference between HashMap and LinkedHashMap
33) Difference between HashMap and TreeMap
34) Difference between Key and Value in Map
35) Difference between put(K,V) and putIfAbsent(K,V) methods
36) Difference between Map and Entry
37) Difference between Comparable and Comparator Interface
38) Difference between JDK, JRE and JVM
39) Difference between while and dowhile
40) Difference between void and null
41) Difference between default constructor and no-arg constructor
42) Difference between Array and Jagged Array
43) Difference between normal binding and Dynamic/Late Binding
44) Difference between running and runnable in Multithreading
45) Difference between sleep and join in Multithreading
46) Difference between Statement and PreparedStatement in JDBC
47) Difference between final and finalize
48) Difference between upcasting and downcasting
49) Difference between class and wrapper class
50) Difference between runtime and compiletime