

# Core Java Syllabus



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# Core Java Syllabus

## Module 1: Introduction to Java

- Overview of Java
    - History and Features
    - JVM, JRE, and JDK
  - Installation and Setup
    - Setting up Java environment
    - Writing and running the first Java program
  - Basic Syntax and Structure
    - Understanding public static void main(String[] args)
    - Comments and naming conventions
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## Module 2: Core Java Concepts

- Data Types and Variables
    - Primitive and non-primitive data types
    - Typecasting
    - Constants and literals
  - Operators
    - Arithmetic, Relational, Logical, Bitwise
    - Unary and Ternary operators
  - Control Statements
    - Decision-making: if, if-else, switch
    - Loops: for, while, do-while
    - Break, Continue, and Return
  - Arrays
    - One-dimensional and multi-dimensional arrays
    - Array operations
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## Module 3: Object-Oriented Programming (OOP)

- Classes and Objects
  - Defining classes
  - Creating objects
- Constructors
  - Default and parameterized constructors
- Methods
  - Method overloading
  - Passing arguments and returning values
- Inheritance
  - Types of inheritance
  - Method overriding
  - Use of super keyword
- Polymorphism
  - Compile-time and runtime polymorphism
- Abstraction
  - Abstract classes and methods
  - Interfaces
- Encapsulation
  - Access modifiers
  - Getters and setters

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## Module 4: Exception Handling

- Types of exceptions
- Try, Catch, Finally
- Throw and Throws
- Custom exceptions

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## Module 5: String Handling

- String class and methods
  - StringBuilder and StringBuffer
  - Regular expressions
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## Module 6: Collections Framework

- Introduction to collections
  - List, Set, Map interfaces
  - ArrayList, LinkedList, HashSet, TreeSet, HashMap, TreeMap
  - Iterators and for-each loop
  - Comparators and Comparable
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## Module 7: Input/Output (I/O)

- File handling
    - FileReader and FileWriter
    - BufferedReader and BufferedWriter
  - Serialization and Deserialization
  - Byte and character streams
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## Module 8: Multithreading

- Thread lifecycle
  - Creating threads
    - Extending Thread class
    - Implementing Runnable interface
  - Synchronization
  - Inter-thread communication
  - Thread pooling
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## Module 9: Advanced Java

- Java Database Connectivity (JDBC)
  - Connecting to databases
  - CRUD operations
- Java Networking
  - Sockets and URLs
  - HTTP and TCP/IP communication
- Java Servlets
  - Introduction to Servlets

- Request and response handling
  - JavaServer Pages (JSP)
    - Basics of JSP
    - JSP with Servlets
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## Module 10: Java 8 and Beyond

- Lambda expressions
  - Functional interfaces
  - Stream API
  - Optional class
  - Date and Time API
  - Default and static methods in interfaces
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## Module 11: Frameworks (Optional/Advanced)

- Spring Framework
    - Spring Boot
    - Dependency Injection
  - Hibernate
    - ORM concepts
    - CRUD operations using Hibernate
  - Microservices with Spring Cloud
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## Module 12: Project and Practical Implementation

- Building a real-world application
  - CRUD application using JDBC
  - Web application using JSP and Servlets
  - Integration with Spring or Hibernate
- Debugging and testing
- Deploying the application