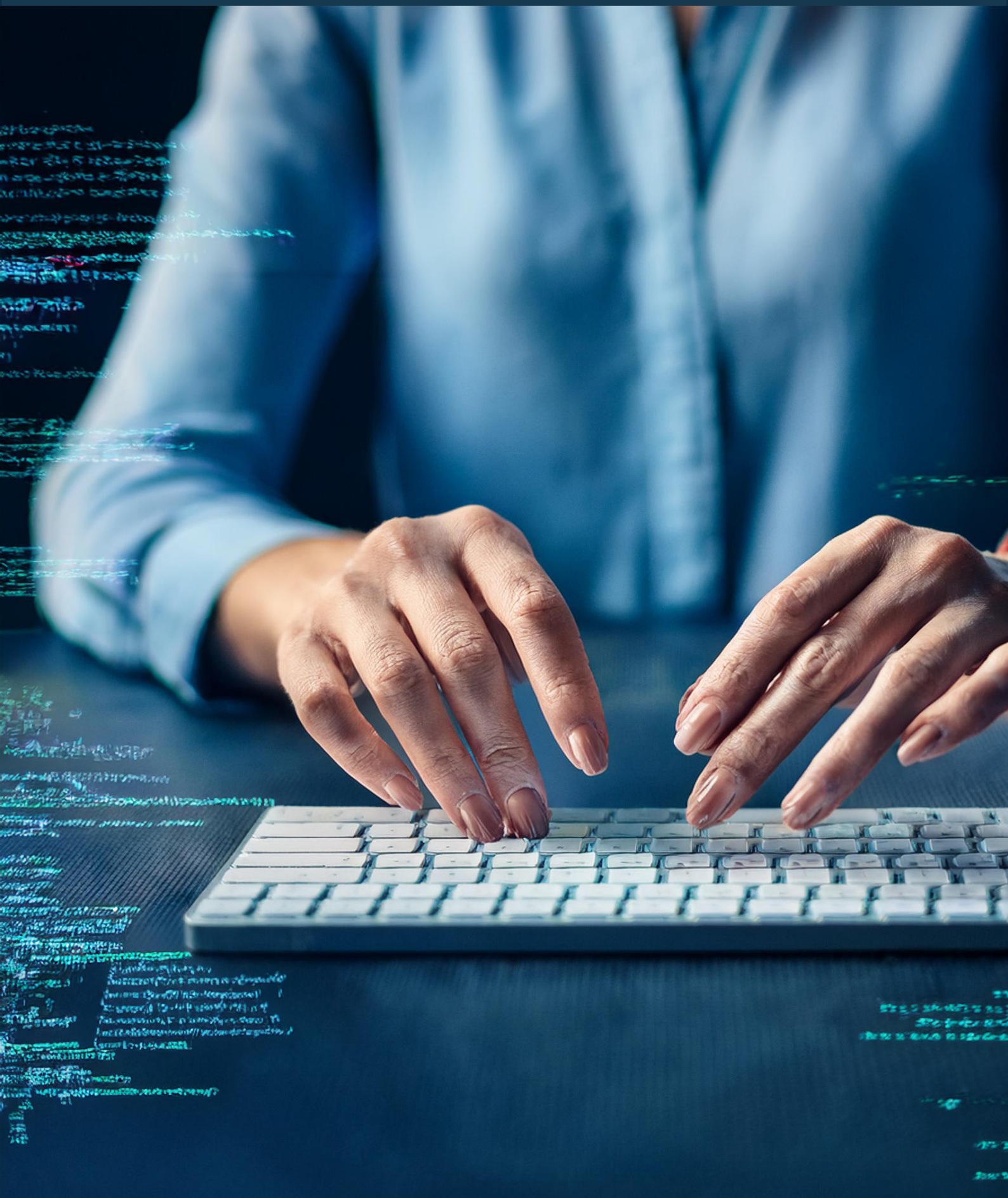
iMSD

Java Course Core Components



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Duration: 3 Days

Related Courses:
Phython, C++, MATLAB, Java, C#, Lisp, Pascal, Scratch,

Course Overview and Objectives

This Java course is designed to provide a comprehensive introduction to Java programming, covering fundamental concepts as well as advanced topics. Whether you're new to programming or looking to expand your skills, this course will help you understand and apply Java in various

contexts, from basic applications to enterprise-level solutions. The course emphasizes object-oriented programming (OOP), best practices, and modern Java development techniques.

Pre-requisites:
Basic knowledge of mathematics (calculus and linear algebra) and programming (e.g., Python or C++) is recommended but not required.

Course Format:
Lectures, hands-on labs, assignments, and a final project.

Java Course Outline

Introduction to Java

- Introduction to the course
- Setting up the environment (Java Development Kit (JDK), Integrated Development Environment (IDE))
- Writing and executing the first Java program

Java Basics

- Syntax and structure of a Java program
- Variables and data types
- Basic operators (arithmetic, comparison, logical)
- Input and output.
- Scanner.
- System.
- Comments and documentation

Control Structures

- Conditional Statements
- `if`, `else`, and `else if` statements
- Switch-case statements

Java loops

- `while` loop
- `for` loop
- `do-while` loop
- Enhanced `for` loop
- Loop control statements
- `break`.
- `continue`.

Object Oriented Programming (OOP)

- Classes and Objects
- Defining classes
- Creating objects
- new` keyword
- Access specifiers (public, private, protected)
- `this` keyword

Class members

- Fields (variables)
- Methods (functions)
- Constructors
- Static members

Java Inheritance

- Extending classes
- `super` keyword
- Method overriding
- `final` keyword

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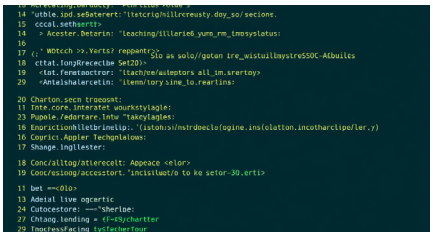
Understand and apply fundamental programming concepts



Programming
Write and debug code to control Java systems using java language.
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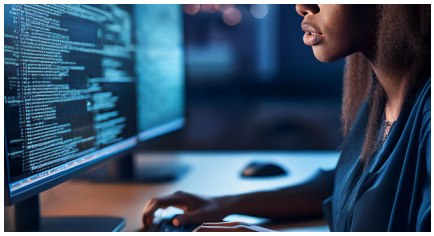

Design process is key
Establish workflows for collecting, analyzing, storyboarding and producing visual stories.

Java Polymorphism
- Method overloading
- Dynamic method dispatch
- Abstract classes and methods
- Interfaces

Encapsulation and Abstraction
- Encapsulation principles
- Getters and setters
- Abstract classes vs. interfaces

Advanced Object-Oriented Concepts
- Inner Classes
- Member inner classes
- Local inner classes
- Anonymous inner classes
- Static nested classes

Lambdar Functions
- Syntax and use cases
- Comparison with regular functions

Packages and Access Modifiers
- Defining packages
- Importing packages
- Access levels and modifiers

Data Structures and Collections
- Array
- Defining and initializing arrays
- Multidimensional arrays
- Array manipulation

Collections Framework
- List, Set, Map interfaces
- ArrayList, LinkedList.
- HashSet.
- TreeSet.
- HashMap.
- TreeMap
- Iterators

Exception Handling
- Try-catch blocks
- Multiple catch blocks
- Finally block
- Throwing exceptions
- Custom exceptions

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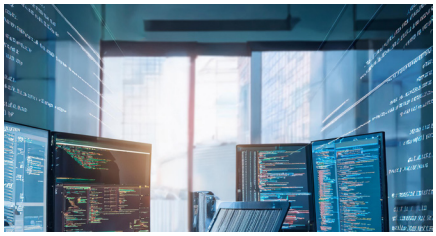
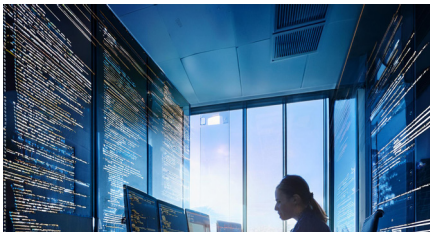


OOP:

Master object-oriented programming (OOP)

Programming
Work with Java Collections and Data Structures

Use the Java Collections Framework to manage and manipulate data efficiently.



Errors
Handle errors and exceptions effectively. Implement robust error handling techniques to ensure the stability and reliability of Java applications.

File I/O and Serialization
- File Handling
- Reading and writing files
- File class
- Byte streams vs. character streams
- BufferedReader and BufferedWriter

Java Serialization
- Serializable interface
- `ObjectOutputStream`
- `ObjectInputStream`
- Transient keyword

Java Standard Librarys
- String and StringBuilder
- Wrapper classes
- Math class
- Date and Time API

Java Concurrency
- Threads and Runnable interface
- Thread states and lifecycle
- Synchronization
- Concurrency utilities.
- Executors.
- CountDownLatch.

GUI Programming
- AWT and Swing basics
- Creating windows and dialogs
- Event handling

Advanced GUI
- Layout managers
- Custom components
- JavaFX basics

Java networking
- Networking Basics
- Java networking API
- Sockets and ServerSockets
- URL and HttpURLConnection

Database Connectivity
- Introduction to JDBC
- Connecting to a database
- Executing SQL queries
- ResultSet and Statement objects

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data persistence

Read from and write to files, and manage data using serialization for persistence.

Build graphical user interfaces (GUIs)

Create interactive Java applications with graphical user interfaces using JavaFX or Swing.

advanced Java features

Gain a basic understanding of advanced topics such as multithreading, concurrency, generics, and the Stream API.

Project Development
- Choosing a project
- Project requirements and scope

Project Implementation
- Writing code
- Testing and debugging

Project Presentation
- Documenting the project
- Presenting the project

Conclusion
- Summary of topics covered
- Best practices in Java programming
- Further learning resources

We offer online support to clients on content covered on our courses.