

Java Full Stack Web Developer

Course outline

Module 1: Introduction to Java

Module 1: Introduction to Java is an introductory course designed to provide a comprehensive overview of the Java programming language. It covers the fundamentals of the language, including variables, data types, operators, control flow, classes, objects, and more. This module is ideal for those who are new to Java and want to learn the basics of the language.

Lessons

- Overview of Java and its features
- Setting up the development environment
- Understanding the Java language syntax
- Working with variables, data types, and operators
- Writing and executing Java programs
- Working with classes and objects
- Understanding inheritance and polymorphism
- Working with packages and interfaces
- Understanding exception handling
- Working with threads and synchronization

After completing this module, students will be able to:

- Understand the fundamentals of the Java programming language
- Write basic Java programs using variables, operators, and control flow
- Utilize the Java API to create classes and objects
- Debug and troubleshoot Java code using the Eclipse IDE

Module 2: Object-Oriented Programming with Java

Module 2 of the Java Full Stack Web Developer course focuses on Object-Oriented Programming with Java. It covers topics such as classes, objects, inheritance, polymorphism, and interfaces. Students will learn how to create and use classes, create and use objects, and use inheritance and polymorphism to create more efficient and reusable code. Additionally, students will learn how to use interfaces to create more flexible and extensible code.

Lessons

- Introduction to Object-Oriented Programming

- Classes and Objects
- Inheritance and Polymorphism
- Interfaces and Abstract Classes
- Exception Handling
- Generics
- Collections Framework
- Streams and Lambda Expressions
- JavaFX
- Java Database Connectivity (JDBC)

After completing this module, students will be able to:

- Understand the fundamentals of object-oriented programming and how to apply them in Java.
- Develop classes, objects, and methods in Java.
- Utilize the Java API to create and manipulate objects.
- Implement inheritance, polymorphism, and abstraction in Java.

Module 3: Web Application Development with Java

Module 3 of the Java Full Stack Web Developer course focuses on web application development with Java. Students will learn how to create dynamic web applications using Java technologies such as JavaServer Pages (JSP), JavaServer Faces (JSF), and Java Servlets. They will also learn how to use frameworks such as Spring MVC and Hibernate to create robust web applications. Additionally, students will learn how to use web services and APIs to integrate their applications with other systems.

Lessons

- Introduction to Java Web Application Development
- Setting up a Java Web Application Development Environment
- Understanding the Java Servlet API
- Developing Java Servlets
- Working with Java Server Pages (JSP)
- Using JavaBeans in Web Applications
- Working with Java Database Connectivity (JDBC)
- Implementing Security in Java Web Applications
- Debugging and Troubleshooting Java Web Applications
- Deploying Java Web Applications

After completing this module, students will be able to:

- Understand the fundamentals of web application development using Java.
- Develop web applications using Java technologies such as Servlets, JSP, JDBC, and JSTL.
- Implement user authentication and authorization using Java Security APIs.
- Utilize Java frameworks such as Spring MVC and Hibernate to build robust web applications.

Module 4: Database Connectivity with Java

Module 4 of the Java Full Stack Web Developer course covers the fundamentals of database connectivity with Java. Students will learn how to use JDBC to connect to a database, execute SQL statements, and retrieve data from the database. Additionally, students will learn how to use the Java Persistence API (JPA) to create and manage database objects.

Lessons

- Introduction to JDBC
- Connecting to a Database with JDBC
- Working with Statements and Prepared Statements
- Working with Result Sets
- Transactions and Batch Processing
- Database Metadata
- Database Security
- Database Performance Tuning
- Database Connectivity with Java EE
- Database Connectivity with Spring Framework

After completing this module, students will be able to:

- Understand the fundamentals of database connectivity with Java.
- Create and execute SQL statements using JDBC.
- Connect to a database using Java Database Connectivity (JDBC).
- Implement CRUD operations using JDBC.

Module 5: Java Server Pages (JSP)

Module 5 of the Java Full Stack Web Developer course covers Java Server Pages (JSP). This module will teach students how to create dynamic web pages using JSP, including how to use JSP tags, expressions, and scriptlets. Students will also learn how to use the JSTL library to create custom tags and how to use the Expression Language (EL) to access data from JavaBeans. Finally, students will learn how to use the JSP Standard Tag Library (JSTL) to create custom tags and how to use the Expression Language (EL) to access data from JavaBeans.

Lessons

- Introduction to JSP
- JSP Syntax and Structure
- JSP Scripting Elements
- JSP Implicit Objects
- JSP Directives
- JSP Actions
- JSP Expression Language
- JSP Custom Tags
- JSP Exception Handling
- JSP and Database Connectivity
- JSP and MVC Architecture
- JSP and AJAX

- JSP and Web Services
- JSP Best Practices
- JSP Security

After completing this module, students will be able to:

- Understand the fundamentals of JSP and how to use it to create dynamic web pages.
- Develop web applications using JSP and servlets.
- Implement custom tags and use the Expression Language (EL) to access data from JavaBeans.
- Utilize the JSTL library to create more efficient and maintainable code.

Module 6: Java Servlets

Module 6 of the Java Full Stack Web Developer course covers the fundamentals of Java Servlets, a technology used to create dynamic web applications. Students will learn how to create and deploy servlets, use servlet containers, and use servlet filters. Additionally, students will learn how to use the JavaServer Pages (JSP) technology to create dynamic web pages.

Lessons

- Introduction to Java Servlets
- Configuring Java Servlets
- Developing Java Servlets
- Working with Sessions and Cookies
- Java Servlet Filters
- Java Servlet Security
- Java Servlet Performance Tuning
- Java Servlet Best Practices
- Java Servlet and JSP Integration
- Java Servlet and AJAX Integration

After completing this module, students will be able to:

- Understand the fundamentals of Java Servlets and how to use them to create dynamic web applications.
- Develop and deploy Java Servlets using the Java EE platform.
- Utilize the Java Servlet API to create and manage sessions, cookies, and authentication.
- Implement Java Servlets to interact with databases and other web services.

Module 7: Java Server Faces (JSF)

Module 7 of the Java Full Stack Web Developer course covers Java Server Faces (JSF), a popular Java-based web application framework. Students will learn how to create web applications using JSF components, create custom components, and use JSF with other technologies such as AJAX and JavaServer Pages (JSP). Additionally, students will learn how to use JSF with popular web frameworks such as Spring and Hibernate.

Lessons

- Introduction to JSF
- JSF Architecture
- JSF Components
- JSF Expression Language
- JSF Rendering
- JSF Navigation
- JSF Validation
- JSF Event Handling
- JSF Data Conversion
- JSF Ajax
- JSF Custom Components
- JSF Security
- JSF Internationalization
- JSF Best Practices
- JSF Integration with Other Frameworks

After completing this module, students will be able to:

- Understand the fundamentals of JSF and its components
- Develop web applications using JSF
- Implement navigation rules and page flows in JSF
- Integrate JSF with other technologies such as Spring, Hibernate, and AJAX

Module 8: Java Persistence API (JPA)

Module 8 of the Java Full Stack Web Developer course covers the Java Persistence API (JPA), which is a Java application programming interface used to access and manage data stored in a relational database. This module will teach students how to use JPA to create, read, update, and delete data from a database, as well as how to use JPA to create and manage relationships between entities. Additionally, students will learn how to use JPA to query data from a database and how to use JPA to optimize performance.

Lessons

- Introduction to JPA
- Configuring JPA
- Working with Entities
- Mapping Relationships
- Querying with JPQL
- Advanced Querying with Criteria API
- Caching with JPA
- Transactions and Concurrency
- Performance Tuning
- Integrating with Spring Framework

After completing this module, students will be able to:

- Understand the fundamentals of the Java Persistence API (JPA) and its components.
- Implement the JPA API to create, read, update, and delete data from a database.
- Utilize the JPA API to create and manage relationships between entities.
- Develop applications that use the JPA API to access and manipulate data in a database.

Module 9: Spring Framework

Module 9 of the Java Full Stack Web Developer course covers the Spring Framework, a powerful open-source framework for developing enterprise Java applications. This module will teach students how to use the Spring Framework to create robust, secure, and maintainable applications. Topics covered include dependency injection, data access, web services, and more.

Lessons

- Introduction to the Spring Framework
- Dependency Injection and Inversion of Control
- Spring Core Container
- Spring MVC
- Spring Security
- Spring Data Access
- Spring Boot
- Spring Cloud
- Spring Web Services
- Spring Testing
- Spring AOP
- Spring Batch
- Spring Integration
- Spring JDBC
- Spring Web Flow
- Spring RESTful Web Services
- Spring NoSQL
- Spring Cloud Streams
- Spring Cloud Data Flow
- Spring Cloud Connectors

After completing this module, students will be able to:

- Understand the fundamentals of the Spring Framework and its components
- Develop applications using the Spring Framework
- Utilize the Spring Framework to create RESTful web services
- Implement dependency injection and inversion of control using the Spring Framework

Module 10: Hibernate

Module 10 of the Java Full Stack Web Developer course covers the Hibernate framework, which is a powerful object-relational mapping tool for Java applications. This module will teach students how to use Hibernate to create and manage database connections, as well as how to use Hibernate to map objects to database tables. Additionally, students will learn how to use Hibernate to query and manipulate data in the database.

Lessons

- Introduction to Hibernate
- Configuring Hibernate
- Mapping Entities with Hibernate
- Working with Hibernate Queries
- Hibernate Caching
- Hibernate Transaction Management
- Hibernate Performance Tuning
- Integrating Hibernate with Spring
- Hibernate Best Practices
- Advanced Hibernate Features

After completing this module, students will be able to:

- Understand the fundamentals of Hibernate and its architecture.
- Implement Hibernate in Java applications to persist data.
- Utilize Hibernate to map Java objects to database tables.
- Create and execute HQL queries to retrieve data from the database.

Module 11: Web Services

Module 11 of the Java Full Stack Web Developer course covers web services, which are a type of application programming interface (API) that allow two applications to communicate with each other over the internet. This module will teach students how to create and consume web services using Java, as well as how to use popular web service frameworks such as JAX-RS and Spring.

Lessons

- Introduction to Web Services
- Understanding SOAP and RESTful Web Services
- Developing Web Services with Java
- Securing Web Services
- Testing and Debugging Web Services
- Deploying Web Services
- Consuming Web Services
- Working with XML and JSON
- Working with WSDL and UDDI
- Advanced Web Services Concepts

After completing this module, students will be able to:

- Understand the fundamentals of web services and how they are used to create distributed applications.
- Develop web services using Java and related technologies such as JAX-WS, JAX-RS, and SOAP.
- Implement security measures for web services such as authentication and authorization.
- Utilize web services to create distributed applications that can be accessed from multiple platforms.

Module 12: RESTful Web Services

Module 12 of the Java Full Stack Web Developer course covers the fundamentals of RESTful web services. Students will learn how to design and develop RESTful web services using the Java programming language. Topics include HTTP methods, URI patterns, JSON and XML data formats, and security considerations. By the end of the module, students will be able to create and deploy their own RESTful web services.

Lessons

- Introduction to RESTful Web Services
- Designing RESTful APIs
- Implementing RESTful Web Services with Java
- Securing RESTful Web Services
- Testing and Debugging RESTful Web Services
- Deploying RESTful Web Services
- Consuming RESTful Web Services
- Advanced Topics in RESTful Web Services
- Best Practices for Developing RESTful Web Services
- Troubleshooting RESTful Web Services

After completing this module, students will be able to:

- Understand the fundamentals of Representational State Transfer (REST) architecture and its principles.
- Develop RESTful web services using Java and the Spring framework.
- Implement CRUD operations using HTTP methods such as GET, POST, PUT, and DELETE.
- Secure RESTful web services using OAuth2 and JWT.

Module 13: JavaScript

Module 13 of the Java Full Stack Web Developer course covers the fundamentals of JavaScript, including variables, functions, objects, and events. It also covers the basics of jQuery, AJAX, and JSON. Students will learn how to use JavaScript to create dynamic web pages and interactive web applications.

Lessons

- Introduction to JavaScript
- Working with Variables and Data Types
- Control Flow and Loops
- Working with Functions

- Working with Objects
- Working with Arrays
- Working with the Document Object Model (DOM)
- Working with Events
- Working with Forms
- Debugging and Error Handling
- Working with Libraries and Frameworks
- Working with AJAX
- Working with APIs
- Security and Performance Considerations
- Building a JavaScript Application

After completing this module, students will be able to:

- Understand the fundamentals of JavaScript, including variables, functions, objects, and arrays.
- Create interactive web pages using JavaScript.
- Utilize the Document Object Model (DOM) to manipulate web page elements.
- Implement client-side validation using JavaScript.

Module 14: HTML and CSS

Module 14 of the Java Full Stack Web Developer course covers HTML and CSS, the two core technologies used to create webpages. Students will learn how to create and style webpages using HTML and CSS, as well as how to use the latest HTML5 and CSS3 features. They will also learn how to use frameworks such as Bootstrap and Foundation to create responsive webpages.

Lessons

- Introduction to HTML
- HTML Syntax and Structure
- Working with Text in HTML
- Working with Images in HTML
- Working with Links in HTML
- Working with Tables in HTML
- Working with Forms in HTML
- Introduction to CSS
- CSS Syntax and Structure
- Working with Text in CSS
- Working with Images in CSS
- Working with Links in CSS
- Working with Tables in CSS
- Working with Forms in CSS
- Responsive Design with CSS
- CSS Frameworks
- CSS Preprocessors
- CSS Animations
- Debugging HTML and CSS
- Cross-Browser Compatibility

After completing this module, students will be able to:

- Understand the fundamentals of HTML and CSS, including the structure of HTML documents, the syntax of HTML and CSS, and the use of HTML and CSS to create webpages.
- Utilize HTML and CSS to create webpages with a variety of elements, including text, images, tables, forms, and navigation.
- Implement responsive design techniques to ensure webpages are optimized for different devices and screen sizes.
- Use CSS to create visually appealing webpages with custom styling and layout.

Module 15: AJAX

Module 15 of the Java Full Stack Web Developer course covers AJAX, a technology used to create interactive web applications. Students will learn how to use AJAX to create dynamic web pages, make asynchronous requests, and update web pages without reloading the page. They will also learn how to use AJAX libraries such as jQuery and AngularJS to create interactive web applications.

Lessons

- Introduction to AJAX
- Understanding the AJAX Request/Response Cycle
- Working with XMLHttpRequest Objects
- Using jQuery for AJAX Requests
- Building an AJAX-Enabled Web Application
- Working with JSON Data
- Debugging AJAX Applications
- Security Considerations for AJAX Applications
- Best Practices for AJAX Development

After completing this module, students will be able to:

- Understand the fundamentals of AJAX and how it works with the DOM.
- Implement AJAX requests using the XMLHttpRequest object.
- Create dynamic webpages using AJAX to update content without reloading the page.
- Utilize AJAX to send and receive data from a server-side script.

Module 16: jQuery

Module 16 of the Java Full Stack Web Developer course covers the basics of jQuery, a popular JavaScript library. Students will learn how to use jQuery to create dynamic web pages and applications, as well as how to use jQuery plugins and UI components. They will also learn how to debug and optimize their code for better performance.

Lessons

- Introduction to jQuery
- Selectors and Filters
- Working with Events
- Manipulating the DOM
- jQuery Effects and Animations
- jQuery AJAX
- jQuery Plugins
- jQuery UI
- Debugging jQuery Code
- Best Practices for jQuery Development

After completing this module, students will be able to:

- Understand the fundamentals of jQuery and how to use it to manipulate the DOM.
- Create interactive webpages using jQuery selectors, events, and effects.
- Utilize jQuery plugins to extend the functionality of webpages.
- Implement AJAX requests to retrieve data from a server and update webpages without reloading.

Module 17: AngularJS

Module 17 of the Java Full Stack Web Developer course covers the fundamentals of AngularJS, a popular JavaScript framework for creating dynamic web applications. Students will learn how to create single-page applications, use two-way data binding, and create custom directives. They will also learn how to use the Angular CLI to create and manage projects, and how to use the Angular Material library for styling.

Lessons

- Introduction to AngularJS
- Setting up an AngularJS Development Environment
- Understanding the AngularJS Architecture
- Working with Controllers and Scope
- Working with Services and Factories
- Working with Directives
- Working with Filters
- Working with Forms
- Working with Routing
- Working with Animations
- Working with Custom Directives
- Working with Third-Party Libraries
- Working with Unit Testing
- Working with End-to-End Testing
- Working with RESTful APIs
- Working with Security
- Deploying an AngularJS Application

After completing this module, students will be able to:

- Understand the fundamentals of AngularJS and its components such as modules, controllers, services, directives, and filters.
- Create single page applications using AngularJS.
- Utilize AngularJS to create dynamic web applications.
- Implement client-side routing and navigation using AngularJS.

Module 18: Node.js

Module 18 of the Java Full Stack Web Developer course covers Node.js, a JavaScript runtime environment used for developing server-side applications. This module will teach students how to use Node.js to create web applications, as well as how to use popular Node.js frameworks such as Express.js and Socket.io. Students will also learn how to use Node.js to interact with databases and create RESTful APIs.

Lessons

- Introduction to Nodejs
- Nodejs Core Concepts
- Working with Nodejs Modules
- Building a Nodejs Web Server
- Working with Expressjs
- Working with MongoDB and Mongoose
- Working with Socketio
- Working with Authentication and Authorization
- Working with RESTful APIs
- Debugging Nodejs Applications
- Deploying Nodejs Applications
- Testing Nodejs Applications
- Performance Optimization of Nodejs Applications
- Security Best Practices for Nodejs Applications
- Building Real-Time Applications with Nodejs
- Building Chatbots with Nodejs
- Building IoT Applications with Nodejs
- Building Machine Learning Applications with Nodejs

After completing this module, students will be able to:

- Understand the fundamentals of Node.js and its core modules.
- Create and deploy Node.js applications.
- Utilize Node.js to build web applications and APIs.
- Integrate Node.js with other technologies such as MongoDB and Express.

Module 19: Testing and Debugging

Module 19 of the Java Full Stack Web Developer course focuses on testing and debugging techniques. Students will learn how to use various tools and techniques to identify and fix errors in their code. They will also learn how to create and execute unit tests to ensure their code is working as expected. Finally,

they will learn how to debug their code in order to identify and fix any issues.

Lessons

- Introduction to Testing and Debugging
- Types of Testing
- Unit Testing
- Integration Testing
- System Testing
- Debugging Techniques
- Automated Testing
- Test-Driven Development
- Test Coverage
- Performance Testing
- Security Testing
- Usability Testing
- Accessibility Testing
- Regression Testing
- Test Case Design
- Test Plan Design
- Test Automation Frameworks
- Test Management Tools
- Test Reporting
- Test Metrics and Analysis

After completing this module, students will be able to:

- Identify and fix errors in code using debugging tools.
- Utilize automated testing tools to ensure code quality.
- Create and execute unit tests to validate code functionality.
- Analyze test results to identify and address potential issues.

Module 20: Deployment and Maintenance

Module 20 of the Java Full Stack Web Developer course covers the fundamentals of deployment and maintenance. Students will learn how to deploy their web applications to production environments, as well as how to maintain and troubleshoot their applications. Topics covered include setting up a web server, configuring a database, and deploying applications to the cloud. Additionally, students will learn how to monitor their applications and troubleshoot any issues that arise.

Lessons

- Introduction to Deployment and Maintenance
- Automated Deployment Strategies
- Version Control Systems
- Troubleshooting and Debugging
- Performance Monitoring and Optimization
- Security and Access Control

- Database Maintenance
- Backup and Recovery Strategies
- Disaster Recovery Planning
- Automated Testing Strategies

After completing this module, students will be able to:

- Understand the fundamentals of deployment and maintenance of web applications.
- Utilize various tools and techniques to deploy and maintain web applications.
- Troubleshoot and debug web applications in production environments.
- Monitor and optimize web applications for performance and scalability.