# SDE Bootcamp

Software Development Engineer

## Overview

This program is designed to educate the students with the best skill sets, tools, and strategies to be an enterprise-level Software Development Engineer with a focus on Full Stack Development.

The instructors of this course are working IT professionals that are currently working as Software Developer in leading  IT companies.

The class will meet online two times a week. Students are expected to spend about 15-20 hours/week studying the materials for the best outcomes.

**Program Outcomes:** A graduate student should have the following abilities:

1. Understand and practice a complete Software Development Life Cycle methodology using Agile-Scrum.
2. Understand basic technologies and enterprise tool suite.
3. Write the enterprise-level Java Program, a complete understanding of Object-Oriented Programming, validation, and important third-party libraries.
4. Develop Microservices for both RESTful and SOAP services using Spring Boot.
5. Understand Structured Query Language (SQL), Data persistent technologies, relational and non-relational databases.
6. Develop applications with enterprise-level security.
7. Develop applications to solve different enterprise-level problems such as Batch Processing of data and Messaging Queue.
8. Develop User Interface with one of the most popular Javascript frameworks.
9. Develop Unit, Integration, and User Interface test with Selenium, Rest-assured Junit, Mockito, and others.
10. Understand the Software Testing process and write Test Plans and documentation.
11. Understanding of CI/CD Pipeline Automation using Jenkins.
12. Understand and explain how enterprise multi-tiered applications are developed and work.

**Technologies**: Java, Spring Boot, React, Redux, SQL, RESTful, SOAP, JUnit, Mockito, RestAssured, JavaScript, CSS, HTML, Selenium WebDriver, Unix, Git, Docker, CI/CD, Jenkins, Cloud, IntelliJ, Eclipse, VS Code, Professional Career Service

Estimated Length: 9 months

# Module 1: SDLC and Technology Basics

**Software Development Lifecycle 101**

| Lesson | Outcomes |
|---|---|
| SDLC | • Understand different Software Development Life Cycles<br>• Understand traditional SDLC methodologies such as Waterfall, Iterative, etc. |
| Agile & Scaled Agile Framework | • Understand Agile methodology<br>• Understand Agile Scrum methodologies and best practices<br>• Understand Scaled Agile<br>• Practice Agile Ceremonies |
| Project Management Tools | • Hands-on experience of enterprise-level tool suite for project management: JIRA, Scrum Board, Wiki/Confluence, etc.<br>• Create JIRA issues, manage defects and workflows |

# Module 2: Database, SQL, and Manual Testing

**Structured Query Language 101**

| Lesson | Outcomes |
|---|---|
| Structured Query Language (SQL) | • Understand SQL functions, aggregators, data types, relations<br>• Data retrieval, update, and insertion process<br>• Familiar with database user-defined functions, triggers, Indexes, etc<br>• Practice queries and stored procedure calls |
| Database tools and types | • Use SQL Developer<br>• Exposure to popular databases: MySQL, PostgreSQL, MongoDB as NoSQL |

**Software Testing 101**

| Lesson | Outcomes |
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| STLC | • Understand the Software Testing Life Cycle<br>• Bug LifeCycle |
| Manual Testing | • Write and execute manual Test cases<br>• Prepare Test Plans, Scenarios, and review.<br>• Defect tracking, logging, and retest<br>• Understand different types of testing: Regression, Smoke, Retest, End to End, etc |

## Module 3: Java Programming - Create a Payroll Application

**Technology Basics 101**

| Lesson | Outcomes |
|---|---|
| Hardware, Software<br>Networks - IoT, Servers, Virtual Machines (VM), Cloud, VPN, Docker<br>Internet Safety | • Deep understanding of enterprise-level hardware and software<br>• Understand different kinds of applications<br>• How to better utilize the internet safely in an enterprise work environment |
| Unix and Windows Commands | • Dig dipper with commands, finding logs, creating and manipulating text using VI editors |

**Source Code Management and Version Control System**

| Lesson | Outcomes |
|---|---|
| Version Control Systems (VCS) | • Understand popular VCS: Git and SVN<br>• Understand the VCS concept and importance |
| Git | • Clone, branch, merge, pull, push, cherry-picking, and conflict resolution |

**Java Programming 101**

| Lesson | Outcomes |
|---|---|
| IDE | • Introduction to popular IDEs: Intellij, Eclipse, etc.<br>• IDE installation and environment preparation |
| Java Fundamentals | • Understand JDK, JRE, JVM<br>• Class, Objects, fields, variables, methods, and functions<br>• Data Types, Control flows, Operators, Logics, and |

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| | Looping |
| Object-Oriented Programming | • Encapsulation<br>• Abstraction<br>• Inheritance<br>• Polymorphism |
| Exception Handling | • Handle checked and unchecked exceptions |
| Advanced Java, Collection Framework and Third-Party Libraries | • Learn important use of Java Collection framework and other third party libraries<br>• Lambda<br>• File System Manipulation (IO)<br>• MultiThreading and Memory Management<br>• Use ReadMe.md for project documentation |
| Build Tools | Maven and Gradle |

Module 3 Project 1: Develop Java Application

## Module 4: Back-End Development with Spring Framework

**Develop Microservices Application with Spring and SpringBoot 201**

| Lesson | Outcomes |
|---|---|
| RESTful and SOAP Services | • Data Transfer over HTTP/HTTPS<br>• HTTP Verbs<br>• JSON data type<br>• XML data type |
| Spring Core Container | • Understand Spring Beans<br>• Understand the Spring Context and Core<br>• Understand Expression Language<br>• Tomcat Servlet Container |
| Spring Web | • Understand Servlet<br>• Spring Web<br>• Thymeleaf |
| Data Access/Integration | • JDBC<br>• ORM: Hibernate<br>• Transaction Management<br>• MyBatis<br>• JdbcTemplate |
| Spring Boot & Micro Services | • Develop RESTful Service |

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| | • Develop a SOAP Service<br>• Spring Data JPA |
| Spring Security | • Handle Authorization and Authentication<br>• Implement role-based authorization |
| Other | • Logging<br>• Messaging Queue<br>• Documentation with swagger<br>• Spring Batch and Scheduler<br>• Implement validation and Error Handling |
| Testing | • Unit Testing with Junit, Mockito<br>• Manual Testing with PostMan, SOAPUI<br>• Integration Testing with Rest-assured |

Module 4 Project: Build Spring Boot Application with Testing Framework

## Module 5: Front-End Development with React

**Develop User Interface with React 101**

| Lesson | Outcomes |
|---|---|
| Browser, Javascript, ES6, and DOM | • HTML and CSS basics<br>• Understand browser and it's component<br>• Javascript Basic<br>  ○ DataTypes, variables, conditionals, loops, functions, arrays, objects<br>• Object-Oriented Javascript<br>• ES6 features<br>  ○ Template string, destructuring, scoping, arrow function, async-await, etc.<br>• Document Object Model (DOM) |

**Develop User Interface with React 201**

| Lesson | Outcomes |
|---|---|
| React, Material UI, and Redux | • React Fundamentals<br>  ○ Rendering UI<br>  ○ State and Props<br>  ○ Lifecycle Management<br>  ○ React Router<br>• Redux for state management |

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| Automate UI Testing with Selenium | Create UI Test framework with Selenium PageObject Model |

Module 5 Project 1: Build a UI
Module 5 Project 2: Selenium

## Module 6: DevOps

**DevOps**

| Lesson | Outcomes |
|---|---|
| Pipeline<br>CI/CD concepts | • Understand the pipeline, CI/CD concepts, and how enterprises use them |
| Jenkins | • Set up Jenkins roles, plugins<br>• Schedule jobs, monitoring, automated emails with test results and other notifications |

## Module 7: Professional Career Service

**Professional Career Development**

| Lesson | Outcomes |
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| Resume Review | • Review and refine Resume<br>• Review GitHub, StackOverflow, and LinkedIn Profiles |
| Job Search Strategies | • Crafting Cover Letter<br>• Conducting Job Search<br>• Job site activities<br>• Networking and Meetups |
| Mock Interviews | • Virtual Interview.<br>• 1-1 interview.<br>• Panel Interview. |