

# **Selenium 4 Test Automation with WebDriver**

**Duration:** 5 Days

**Target Audience:** Manual Testers, Automation Engineers, Developers, QA Leads

**Prerequisites:**

- Basic programming knowledge (Java/Python/C# recommended — Java preferred)
  - Understanding of software testing fundamentals
  - Basic knowledge of HTML, DOM, and web applications
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## **Day 1 — Automation Testing Fundamentals & Selenium Setup**

**Topics**

- Introduction to Test Automation
- Manual vs Automation Testing
- Automation Testing Life Cycle
- Overview of Selenium Suite
  - Selenium IDE
  - Selenium WebDriver
  - Selenium Grid
- What's New in Selenium 4
  - W3C WebDriver Standard
  - Relative Locators
  - Improved Grid Architecture
  - DevTools Integration
- Setting up Automation Environment
  - JDK Installation
  - IDE Setup (IntelliJ / Eclipse / VS Code)
  - Build Tools (Maven/Gradle)
  - Browser Drivers (Chrome, Firefox, Edge)
- Creating First Selenium Test Script
- WebDriver Architecture

**Hands-on Labs**

- Install required tools
  - Configure Selenium with Maven
  - Launch browser using WebDriver
  - Open a website and validate title
  - Close browser session
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## **Day 2 — Web Element Handling & Synchronization**

**Topics**

- Understanding DOM Structure
- Locating Web Elements
  - ID, Name, Class, TagName
  - LinkText, PartialLinkText
  - CSS Selector
  - XPath (Absolute vs Relative)
- WebDriver Commands
  - get(), navigate()
  - click(), sendKeys(), clear()
  - getText(), getAttribute()
- Handling Web Components
  - Text Boxes, Buttons
  - Checkboxes & Radio Buttons
  - Drop-downs (Select class)
- Wait Mechanisms
  - Implicit Wait
  - Explicit Wait
  - Fluent Wait
- Handling Alerts & Popups

#### Hands-on Labs

- Automate login functionality
  - Handle dropdown selections
  - Validate messages on page
  - Implement explicit wait for dynamic content
  - Handle JavaScript alert
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## Day 3 — Advanced Web Interactions

#### Topics

- Handling Complex UI Elements
  - Frames & iFrames
  - Windows & Tabs
- Actions Class
  - Mouse Hover
  - Drag & Drop
  - Right Click
  - Double Click
- Keyboard Actions
- Scrolling Techniques
- File Upload & Download Automation
- Handling Dynamic Web Tables
- Introduction to JavaScriptExecutor
- Introduction to Relative Locators (Selenium 4 Feature)

#### Hands-on Labs

- Switch between frames and windows
  - Perform drag-and-drop operation
  - Automate file upload scenario
  - Extract data from dynamic table
  - Use relative locators to identify elements
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## Day 4 — Test Framework Design & Reporting

### Topics

- Need for Test Frameworks
- Types of Frameworks
  - Linear
  - Modular
  - Data-Driven
  - Keyword-Driven
  - Hybrid Framework
- TestNG / JUnit Integration
  - Annotations
  - Test Execution Flow
  - Assertions
  - Parameterization
  - Data Providers
- Page Object Model (POM)
- Page Factory Pattern
- Handling Test Data
- Logging & Reporting
  - Log4j
  - Extent Reports / Allure Reports
- Configuration Management (Properties Files)

### Hands-on Labs

- Create TestNG test suite
  - Implement Page Object Model
  - Parameterize test data
  - Generate HTML test report
  - Run tests using Maven
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## Day 5 — Parallel Execution, Grid & CI/CD Integration

### Topics

- Selenium Grid 4 Architecture
  - Hub & Node Concepts
  - Distributed Execution
  - Docker-based Grid (overview)

- Parallel Test Execution
- Cross-Browser Testing
- Headless Browser Testing
- Integration with CI/CD Tools
  - Jenkins Integration
  - Running tests from pipeline
- Version Control Integration (Git)
- Best Practices for Scalable Automation
- Debugging & Troubleshooting
- Industry Use Cases & Real-World Implementation