Selenium Course Content

1. Introduction to Automation and Selenium

- What is Automation Testing?

- Introduction to Selenium

- History and evolution of Selenium

- Selenium suite of tools (Selenium WebDriver, Selenium Grid, Selenium IDE)

- Advantages of Selenium for automation testing

- Overview of supported languages (Java, Python, C#, etc.)

2. Setting Up Selenium Environment

- Installing Java (if using Java with Selenium)

- Installing Selenium WebDriver

- Setting up IDE (Eclipse, IntelliJ, or Visual Studio)

- Downloading browser drivers (ChromeDriver, GeckoDriver)

- Writing your first Selenium test

3. Basics of WebDriver

- Understanding the WebDriver architecture

- WebDriver interface and its implementations (ChromeDriver, FirefoxDriver, etc.)

- Basic operations with WebDriver (open browser, close browser)

- Managing browser sessions

4. Locating Web Elements

- Introduction to HTML and DOM structure

- Techniques for locating web elements:

  - By ID

  - By Name

  - By Class Name

  - By Tag Name

  - By CSS Selectors

  - By XPath (absolute and relative)

- Best practices for locating elements

5. Web Element Interaction

- Understanding WebElement interface

- Performing basic actions:

- o Clicking buttons

- o Entering text into fields

- o Selecting from dropdowns

- o Submitting forms

- Handling multiple elements (checkboxes, radio buttons)

- Drag and drop operations

6. Working with Waits in Selenium

- Importance of handling synchronization issues

- Types of waits:

  - o Implicit Wait

  - o Explicit Wait (WebDriverWait)

  - o Fluent Wait

- Working with expected conditions (element to be clickable, element to be visible, etc.)

7. Handling Different Browser Windows and Alerts

- Working with multiple browser windows/tabs

- Switching between windows

- Handling browser pop-ups and alerts

- Handling frames and iframes in Selenium

8. Handling Web Tables and Dynamic Elements

- Identifying web tables

- Extracting data from tables

- Handling dynamic web elements (elements that change with time)

- Working with AJAX-based web elements

9. Browser Navigation

- Navigating forward and backward in the browser

- Refreshing the page

- Capturing the current URL

- Working with cookies and browser history

10. Taking Screenshots

- Capturing screenshots of web pages

- Saving screenshots during test execution

- Screenshots for failure analysis

11. Test Framework Integration

- Introduction to TestNG (Java) or PyTest (Python) framework

- Setting up TestNG with Selenium

- Creating test suites

- Using annotations in TestNG (@Test, @BeforeClass, @AfterClass, etc.)

- Assertions and test validations

12. Data-Driven Testing in Selenium

- Introduction to data-driven testing

- Reading data from external files (Excel, CSV)

- Using Apache POI for Excel reading and writing (Java-based)

- Parameterization of tests using TestNG

- Handling test data dynamically

13. Page Object Model (POM) Design Pattern

- Introduction to Page Object Model

- Benefits of POM for test automation

- Creating and using page classes

- Implementing POM with Selenium

- Best practices for Page Object Model

14. Handling Files and Downloads

- Automating file downloads

- Handling file uploads

- Verifying downloaded files

- Working with browser profiles to handle file download settings

15. Cross-Browser Testing with Selenium

- Importance of cross-browser testing

- Running tests on multiple browsers (Chrome, Firefox, Edge, etc.)

- Cross-browser compatibility issues and debugging

16. Selenium Grid for Parallel and Distributed Testing

- Introduction to Selenium Grid

- Setting up Selenium Grid hub and nodes

- Configuring and running tests in parallel

- Running tests on multiple browsers and operating systems

- Distributed testing with Selenium Grid

17. Continuous Integration with Selenium

- Introduction to Continuous Integration (CI) and Continuous Testing

- Integrating Selenium with Jenkins

- Running Selenium tests in CI/CD pipeline

- Configuring Selenium tests to run on Git commits or scheduled builds

- Reporting test results in Jenkins

18. Reporting and Logging in Selenium

- Generating test reports in TestNG

- Using ExtentReports for detailed test reporting

- Adding logs in Selenium tests using Log4j

- Analyzing reports and logs for test failures

19. Best Practices in Selenium Automation

- Writing clean, maintainable test code

- Debugging common Selenium issues

- Handling flaky tests and improving test reliability

- Optimizing Selenium test execution for performance