CERTIFICATION SYLLABUS

Certified Selenium Automation Specialist

Exam Code: CST-SEL™



A complete preparation guide covering exam objectives, core competencies, domain weightage, and topics to prepare.

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   - *CI/CD Integration & DevOps Practices*
   - *Reporting, Logging & Debugging*
   - *Best Practices, Maintenance & Scalability*

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Objective of the Certification

- **Build a strong foundation in Selenium WebDriver architecture —** understanding how Selenium communicates with browsers via the WebDriver protocol and browser drivers.
- **Develop proficiency in locator strategies and element interaction —** reliably identifying and interacting with web elements using ID, Name, CSS Selectors, XPath, and other strategies.
- **Establish competency in test automation framework design —** building maintainable, scalable frameworks using design patterns such as Page Object Model (POM) and Page Factory.
- **Build skills in test execution management —** using TestNG/JUnit for test organization, data-driven testing, and parallel/cross-browser execution.
- **Develop cross-browser and cross-platform testing capability —** ensuring automated tests run reliably across different browsers, operating systems, and devices (including Selenium Grid).
- **Introduce CI/CD integration practices —** integrating automated test suites into continuous integration pipelines (e.g., Jenkins, GitHub Actions, Azure DevOps).
- **Build competency in reporting, logging, and debugging —** generating actionable test reports and diagnosing automation failures efficiently.
- **Establish best practices for framework maintainability and scalability —** writing reusable, robust code that scales with growing test suites and application complexity.
- **Prepare candidates to contribute effectively to automation teams —** equipping them with practical skills to build, extend, and maintain real-world automation suites.
- **Create a foundation for progression toward advanced automation and SDET roles —** such as framework architecture, performance testing, or automation leadership positions.

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Core Competencies — CST-SEL™ (Selenium Automation Specialist)



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1. Selenium WebDriver Fundamentals & Architecture

- Explain the Selenium WebDriver architecture, including the WebDriver protocol and browser driver communication.
- Understand the Selenium component suite (WebDriver, Grid) and where each fits in an automation strategy.
- Set up and configure a Selenium project environment (drivers, dependencies, IDE/build tools).

2. Locator Strategies & Element Interaction

- Apply locator strategies (ID, Name, Class Name, CSS Selector, XPath, Link Text) to reliably identify web elements.
- Handle dynamic elements, waits (implicit, explicit, fluent), and synchronization issues.
- Interact with complex UI elements: dropdowns, alerts, frames/iframes, multiple windows/tabs, and mouse/keyboard actions.

3. Test Framework Design & Design Patterns

- Design and implement the Page Object Model (POM) and Page Factory patterns for maintainable test code.
- Structure a test automation framework (folder structure, configuration management, reusable utilities).
- Apply design principles that reduce duplication and improve framework scalability.

4. Test Execution Management

- Organize and execute tests using TestNG or JUnit (annotations, assertions, test suites, grouping, prioritization).
- Implement data-driven testing using external data sources (Excel, CSV, JSON, databases).
- Configure parallel test execution to reduce overall test suite runtime.

5. Cross-Browser & Cross-Platform Testing

- Execute tests across multiple browsers (Chrome, Firefox, Edge, Safari) and validate consistent behavior.
- Configure and use Selenium Grid (or cloud-based grids) for distributed, cross-platform execution.
- Identify and handle browser-specific quirks and compatibility issues.

6. CI/CD Integration & DevOps Practices

- Integrate Selenium test suites into CI/CD pipelines (e.g., Jenkins, GitHub Actions, Azure DevOps, GitLab CI).
- Configure automated test triggers (on commit, scheduled runs, pre-deployment gates).

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- Understand how automation fits into a broader DevOps/continuous testing strategy.

7. Reporting, Logging & Debugging

- Generate and interpret test execution reports (e.g., TestNG/JUnit reports, Extent Reports, Allure).
- Implement logging strategies to capture meaningful diagnostic information during test runs.
- Debug common automation failures: locator issues, timing/synchronization problems, environment inconsistencies.

8. Best Practices, Maintenance & Scalability

- Apply coding best practices for readability, reusability, and maintainability of automation code.
- Manage test data and environment configuration to support scalable execution across environments.
- Plan for framework evolution as application UI and test coverage grow over time.

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Who Should Take This Certification

- Manual QA testers transitioning into test automation roles.
- SDETs (Software Development Engineers in Test) building or maintaining automation frameworks.
- QA Automation Engineers responsible for Selenium-based test suites.
- Developers contributing to test automation as part of a DevOps or Agile team.
- Automation leads/architects evaluating or standardizing team automation practices.
- Individuals who have completed CSTF™ (or hold equivalent foundational testing knowledge) and want to specialize in automation.

Exam Information

Exam Name	Selenium Automation Specialist
Exam Code	CST-SEL™
Exam Format	Multiple Choice Questions (MCQ) & Code-Based/Practical Scenario Questions
Duration	120 minutes
Number of Questions	75
Passing Score	70%
Mode of Exam	Test Center Based Testing / Online Testing
Language	English
Validity	Lifetime
Open Book	No

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Examination Domain & Weightage

Domain	Weightage
Selenium WebDriver Fundamentals & Architecture	15%
Locator Strategies & Element Interaction	15%
Test Framework Design & Design Patterns	20%
Test Execution Management	15%
Cross-Browser & Cross-Platform Testing	10%
CI/CD Integration & DevOps Practices	10%
Reporting, Logging & Debugging	8%
Best Practices, Maintenance & Scalability	7%
Total	**100%**

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Topics to Prepare

The topics below represent the core areas candidates should focus on for each domain, reflecting the practical, hands-on depth expected at the CST-SEL™ level.

1. Selenium WebDriver Fundamentals & Architecture

- **WebDriver Architecture:** How WebDriver communicates with browser drivers and browsers via the WebDriver protocol.
- **Selenium Components:** WebDriver vs. Selenium Grid, and where each is used.
- **Environment Setup:** Configuring drivers, project dependencies, and build tools (Maven/Gradle).

2. Locator Strategies & Element Interaction

- **Locator Types:** ID, Name, Class Name, CSS Selector, XPath, Link/Partial Link Text.
- **Waits & Synchronization:** Implicit, explicit, and fluent waits to handle dynamic content.
- **Complex UI Handling:** Dropdowns, alerts, frames/iframes, multiple windows/tabs, and Actions class for mouse/keyboard events.

3. Test Framework Design & Design Patterns

- **Page Object Model (POM):** Structuring page classes to separate test logic from UI locators.
- **Page Factory:** Using annotations to initialize page elements efficiently.
- **Framework Structure:** Organizing folders, configuration files, and reusable utility classes for scalability.

4. Test Execution Management

- **TestNG/JUnit Basics:** Annotations, assertions, test grouping, and prioritization.
- **Data-Driven Testing:** Supplying test data via Excel, CSV, JSON, or databases.
- **Parallel Execution:** Configuring parallel runs to reduce total execution time.

5. Cross-Browser & Cross-Platform Testing

- **Multi-Browser Execution:** Running and validating tests across Chrome, Firefox, Edge, and Safari.
- **Selenium Grid:** Setting up distributed/cloud-based execution across browsers and platforms.
- **Browser-Specific Handling:** Identifying and working around browser compatibility issues.

6. CI/CD Integration & DevOps Practices

- **Pipeline Integration:** Incorporating Selenium suites into Jenkins, GitHub Actions, Azure DevOps, or GitLab CI.

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- **Automated Triggers:** Running tests on commit, on a schedule, or as a pre-deployment gate.
- **Continuous Testing Mindset:** Understanding automation's role within a broader DevOps strategy.

7. Reporting, Logging & Debugging

- **Test Reporting:** Generating and interpreting reports (TestNG/JUnit, Extent Reports, Allure).
- **Logging Practices:** Capturing meaningful diagnostic information during execution.
- **Debugging Failures:** Diagnosing locator issues, timing problems, and environment-related failures.

8. Best Practices, Maintenance & Scalability

- **Code Quality:** Writing readable, reusable, and maintainable automation code.
- **Test Data & Environment Management:** Supporting execution across multiple environments.
- **Framework Evolution:** Planning for growth as application UI and test coverage expand.

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