



# HANSTIRTHA

ONLINE SOFTWARE TRAINING & PLACEMENT ACADEMY

TEST • AUTOMATETION

## FULL SOFTWARE TESTING PROGRAM

Manual Testing | Java | SQL | Selenium Automation

JOB-ORIENTED • PRACTICAL • INTERVIEW-FOCUSE

Course Syllabus

### FULL SOFTWARE TESTING PROGRAM

|                 |                                                                             |
|-----------------|-----------------------------------------------------------------------------|
| Course Focus    | Manual Testing + Java + SQL + Selenium Automation                           |
| Training Mode   | Online Training                                                             |
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| Academy Address | Pune-Maharashtra-India                                                      |

## YOUR LEARNING ROADMAP

A structured path from programming fundamentals to industry-oriented automation testing.

|    |                                                                                                      |
|----|------------------------------------------------------------------------------------------------------|
| 01 | <b>Java Programming</b><br>Core Java concepts, OOP, collections, exceptions, Java 8 features         |
| 02 | <b>Web Fundamentals</b><br>HTML, CSS and JavaScript basics for web testing                           |
| 03 | <b>SQL &amp; Database</b><br>SQL fundamentals, queries, filtering, functions and joins               |
| 04 | <b>Manual Testing</b><br>STLC, SDLC, test design, execution, defects and metrics                     |
| 05 | <b>Selenium Automation</b><br>WebDriver, locators, UI interactions and advanced Selenium             |
| 06 | <b>TestNG &amp; Maven</b><br>Test execution, data-driven testing, configuration and build management |
| 07 | <b>Framework &amp; Reports</b><br>Reusable components, properties, reporting and framework practices |
| 08 | <b>CI &amp; Advanced</b><br>Jenkins, POM/Page Factory and Selenium Grid                              |

## MODULE 01 | CORE JAVA

### 1. Java & Development Environment

- Java overview, history, importance, benefits and key features.
- JDK, JRE, JVM and JIT concepts.
- Installing the JDK, configuring PATH and setting up Eclipse.
- Eclipse navigation and useful keyboard shortcuts.

### 2. Java Foundations

- Data types, variables, operators and user-defined variables.
- Classes, methods, objects and the Object class.
- Control statements and loop structures.
- Packages, imports and class communication.
- Instance blocks and static blocks.

### 3. Object-Oriented Programming

- Classes and objects; encapsulation.
- Inheritance, polymorphism and abstraction.
- Access modifiers: private, default, protected and public.
- this, super, static, final, abstract and synchronized keywords.
- Company-oriented scenarios and real-life examples.

### 4. Logic Building & Utility Programming

- String programs and array programs.
- String, StringBuffer and StringBuilder.
- Wrapper classes, Math and Arrays utility classes.
- Practical problem-solving exercises.

### 5. Exception Handling & I/O

- Exceptions versus errors and exception hierarchy.
- try, catch, throw, throws and finally.
- User-defined exceptions.
- Input/output streams and reading/writing files.

### 6. Multithreading & Memory

- Thread fundamentals, creation and management.
- Thread class, Runnable interface and thread life cycle.
- Daemon and non-daemon threads; useful thread methods.
- Garbage collection, memory management and System.gc()/Runtime.gc().

### 7. Collections & Java 8

- Collection framework, interfaces and utility class.
- List, Set and Map with ArrayList, Vector, LinkedList, HashSet, TreeSet, LinkedHashSet, HashMap, TreeMap, LinkedHashSet and Hashtable.
- Generics, iterators, for-each, autoboxing, Comparator and Comparable.
- Lambda expressions, functional interfaces, default/static interface methods.
- Stream API and Date/Time API with practical use cases.

## MODULE 02 | WEB FUNDAMENTALS

### 1. HTML Basics

- HTML introduction, syntax and document structure.
- Headings, paragraphs, line breaks, horizontal rules and common tags.
- Ordered/unordered lists and list items.
- Hyperlinks, URLs, paths, link text and link targeting.

### 2. CSS Essentials

- CSS role in web development and basic syntax.
- Inline, internal and external CSS.
- Element, class and ID selectors.
- Text/background colours and font properties.
- Borders, rounded corners, margins and padding.

### 3. JavaScript Basics

- JavaScript introduction and role in web applications.
- Adding JavaScript to an HTML page.
- Variables, data types and basic operations.
- if statements, loops and introductory functions.

## MODULE 03 | SQL & DATABASE FUNDAMENTALS

### 1. Database & SQL Introduction

- Purpose and importance of databases.
- Relational and NoSQL database overview.
- SQL as a language for managing and retrieving data.
- DDL, DML and DQL categories.

### 2. MySQL Setup & Query Fundamentals

- Installing MySQL and configuring database settings.
- Command-line and graphical database tools.
- CREATE, ALTER, TRUNCATE, DROP and RENAME.
- INSERT, SELECT, UPDATE and DELETE.

### 3. Filtering, Functions & Advanced SQL

- Data filtering, logical operators, LIKE and wildcard characters.
- IN, BETWEEN, ORDER BY and NULL handling.
- Aggregate, string, date and time functions.
- GROUP BY and HAVING.
- Subqueries, EXISTS, ANY and ALL.
- INNER, LEFT, RIGHT and FULL joins.

## MODULE 04 | MANUAL SOFTWARE TESTING

### 1. Testing Fundamentals

- Meaning, purpose and importance of software testing.
- Roles and responsibilities in testing.
- Software quality and how much testing is enough.
- Principles of software testing.
- Manual testing versus automation testing.

### 2. SDLC & Development Models

- SDLC phases: requirements, analysis, design, coding, testing, delivery and maintenance.
- Waterfall, V-Model, Agile, Prototype and Spiral models.

### 3. Testing Methodologies & Levels

- Functional and non-functional testing.
- White-box, black-box and grey-box testing.
- Unit, integration, system and user acceptance testing.
- Performance, memory, scalability, compatibility and security testing.
- Cookies, session, recovery, installation, ad-hoc, risk-based, I18N, L10N and compliance testing.
- Smoke/sanity, regression and retesting.

### 4. Test Design Techniques

- Boundary Value Analysis.
- Equivalence Class Partitioning.
- State Transition testing.
- Use Case testing.
- Error guessing and exploratory testing.

### 5. QA, QC & Testing

- Quality Assurance and Quality Control.
- Differences between QA, QC and testing.

### 6. STLC & Test Planning

- Requirements analysis/design and understanding SRS.
- Test planning: objectives, scope, schedule, approach, roles and responsibilities.
- Assumptions, risks and mitigations.
- Entry/exit criteria, test automation considerations and deliverables.
- Test environment setup, hardware/software requirements and test data preparation.
- Test closure criteria and test summary report.
- Test measurements, purpose of metrics, metric life cycle and manual test metrics.

### 7. Test Cases & Defect Management

- Test scenarios versus test cases.
- Test case design, templates, types of test cases and review.
- Requirements traceability matrix.
- Test execution and defect tracking/reporting.
- Bug types, defect identification and defect life cycle.
- Severity and priority.

## MODULE 05 | SELENIUM AUTOMATION TESTING

### 1. Automation Setup & WebDriver

- Selenium history and introduction.
- Java and Eclipse installation/configuration for automation.
- Selenium libraries/JAR configuration.
- Java fundamentals required for Selenium.
- WebDriver interface and browser invocation.
- Core WebDriver methods and first automation program.

### 2. Browsers, Data & Test Execution

- Running tests with supported browsers and browser configuration.
- Apache POI/JXL concepts for spreadsheet interaction.
- Reading data from Excel and updating Excel data.
- Data-driven testing using Excel data.

### 3. Web Elements & Locators

- Web element validation.
- XPath using attributes and tag names.
- CSS selectors and locator techniques.
- ID, name, class name, link text and other locator approaches.
- Practical locator identification and debugging.

### 4. Selenium UI Interactions

- Static and dynamic dropdowns.
- Checkboxes and radio buttons.
- JavaScript alerts and alert handling.
- Tables/grid handling.
- Mouse/AJAX interactions using Actions.
- Multiple windows and window handles.
- Frames and iframe techniques.
- UL/LI elements and practical web UI automation.

### 5. Synchronization & Browser Handling

- Synchronization problems and handling strategies.
- Window maximization and cookie management.
- HTTPS certificate handling.
- Troubleshooting browser invocation issues.
- Process handling and practical Selenium troubleshooting.
- Taking screenshots.

### 6. End-to-End Practice

- End-to-end WebDriver exercise.
- Real-time web UI automation scenarios.
- Combining locators, waits, interactions and validations in practical scripts.

## MODULE 06 | TESTNG, DATA-DRIVEN TESTING & MAVEN

### 1. TestNG

- Purpose of TestNG and its advantages.
- TestNG installation and Eclipse setup.
- Annotations and test execution.
- Test prioritization, enabling/disabling tests and timeouts.
- testng.xml: inclusion/exclusion and execution control.
- Groups and group-based execution.
- Data-driven testing and DataProvider.
- Parameterization through TestNG XML.

### 2. Data-Driven Framework

- Why test data should not be hard-coded.
- Global parameters with Java.
- Reusable components.
- Reading and managing parameters through properties files.
- Data-driven parameterization using external configuration.

### 3. Maven Build Management

- Build management concepts.
- Maven installation and configuration.
- Understanding pom.xml.
- Managing project dependencies and build lifecycle.

## MODULE 07 | AUTOMATION FRAMEWORK & REPORTING

### 1. Framework Practices

- Reusable automation components.
- Organizing test data, configuration and reusable utilities.
- Practical framework structure and maintainability.
- Real-time troubleshooting and debugging approaches.

### 2. Execution Reports

- Understanding execution reports used for client communication.
- Configuring XSLT-style reporting.
- Generating HTML execution reports for Selenium.
- Test execution and result interpretation.

## MODULE 08 | ADVANCED SELENIUM & INDUSTRY TOOLS

### 1. Jenkins & Continuous Integration

- Why Jenkins is used in automation projects.
- Installing and configuring Jenkins with Java.
- Creating a Jenkins project.
- Integrating an existing automation framework.
- Running and scheduling automation from Jenkins.

### 2. Page Object Model & Page Factory

- Page Object Model concept and benefits.
- Creating page-object constructors/classes.
- Object repository mechanism.
- Practical Page Object Model exercise.
- Page Factory and its advantages.
- @FindBy and Page Factory annotations.
- Practical Page Factory implementation.

### 3. Selenium Grid & Remote Execution

- Cross-browser testing with Selenium Grid.
- Grid concepts and architecture.
- Hub and Node configuration.
- Registering Nodes with a Hub.
- Desired Capabilities / browser configuration.
- Executing Selenium scripts on remote machines.



## MODULE 09 | PRACTICAL & CAREER PREPARATION

### 1. Hands-on Learning

- Topic-wise practical exercises.
- Real-time problem statements and solutions.
- Debugging and troubleshooting practice.
- Industry-oriented scenarios and automation exercises.
- End-to-end practice project based on the technologies covered.

### 2. Assessment & Interview Preparation

- Topic-wise tests and assessments.
- Mock interview preparation.
- One-to-one discussion and feedback.
- Resume-building guidance.
- Logic-building and communication practice.
- Interview-oriented technical revision.

### 3. Placement-Oriented Support

- Interview preparation alongside professional grooming.
- Practice interviews and feedback.
- Job-interview participation guidance.
- Career-oriented support throughout the learning journey.

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