



**Diploma Program in  
'Software Testing'**

**Duration: 32 weeks (160 hours)**

Sr. No.	Name of the Programme	Details About the Programme	Remarks
1.	<p style="text-align: center;"><b>Diploma certificate course in ‘Software Testing’</b></p>	<p><b>Mission of AIITS:</b> The mission of AIITS is to advance knowledge and educate students in information Technology and other areas that will best serve the nation.</p> <p><b>Vision of AIITS:</b> To position AIITS as a premier institute responsive to emerging needs of industry. To produce high skilled graduates and contribute towards sustainable development of the industry and nation.</p>	
		<p style="text-align: center;"><b>1. <u>Introduction to the Programme:</u></b></p> <p>Software testing is the process of evaluating and verifying that a software product or application does what it is supposed to do. The benefits of testing include preventing bugs, reducing development costs and improving performance. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but not necessarily limited to:</p> <ul style="list-style-type: none"> <li>• analyzing the product requirements for completeness and correctness in various contexts like industry perspective, business perspective, feasibility and viability of implementation, usability, performance, security, infrastructure considerations, etc.</li> <li>• reviewing the product architecture and the overall design of the product</li> <li>• working with product developers on improvement in coding techniques, design patterns, tests that can be written as part of code based on various techniques like boundary conditions, etc.</li> <li>• executing a program or application with the intent of examining behavior</li> <li>• reviewing the deployment infrastructure and associated scripts &amp; automation</li> <li>• take part in production activities by using monitoring &amp; observability techniques</li> </ul> <p>The course aims at utilizing fully the capabilities of the free and open source software. In the training 30% will be theoretical and 70% will be hands-on training.</p> <p style="text-align: center;"><b>2. Objectives of the Programme:</b></p>	

		<p>The course aims at covering the fundamental of Software testing, analyzing the product requirements for completeness and correctness in various contexts like industry perspective, business perspective, feasibility and viability of implementation, usability, performance, security, infrastructure considerations, etc.</p> <p><b><u>Objectives:</u> the objectives of the proposed course are to impart knowledge on the following:</b></p> <ol style="list-style-type: none"> <li>1. Building concepts of Software Testing, check its functionality and it performance.</li> <li>2. Learn skills which can give a very promising career.</li> </ol>	
		<p><b>3. Target Group of Learners:</b></p> <p>Diploma in software testing is meant for anyone who want to make their career in IT and software testing. Career options will be there for software tester for manual testing, automation testing, security testing, performance testing. Any students after completion of this program can get placed in industry as tester and QA engineer and with experience they can grow in their career path. It also helps to build a promising career in every aspects.</p>	
		<p><b>4. Instructional Design:</b></p> <p>The course will consist of live lectures, videos and assignments for every modules. After every module doubt-clearing sessions will be arranged where students will be free to clear their doubts. After the completion of six modules projects will be allotted to students.</p>	
		<p><b>5. Instructional Design:</b></p> <ol style="list-style-type: none"> <li>i. <b><u>Duration of the Programme:</u> 8 months</b></li> <li>ii. <b><u>Course delivery</u></b></li> </ol> <p>The course will be entirely delivered <i><b>offline and online if required.</b></i> There are six modules in the course which will be conducted online by expert faculties in the respective areas. Each week's menu will cover the following:</p> <ol style="list-style-type: none"> <li>1. <b><u>Interactive offline lectures:</u></b> This online sessions will be conducted either on Microsoft team or Google meet or Zoom. The session link will be shared with the students.</li> </ol>	

		<p>2. <b><u>Lecture(s)</u></b>: the theoretical and applied parts of the topic will be covered in lectures.</p> <p>3. <b><u>Exercises and data</u></b>: Assignments will be allocated to the participants which they need to complete and submit and assessments on any particular module will be done based on the assignments.</p> <p>4. <b><u>Doubt-clearing</u></b>: There will be an interactive forum as a platform to interact with each other and with the resource persons. Here the participants can discuss their difficulties, can ask questions and get the doubts clarified.</p>	
		<p>6. <b><u>Eligibility</u></b>: Students who have passed any bachelor's in Science/ IT/CS/ Engineering/ from any recognized universities in India or other countries.</p>	
		<p>7. <b><u>Scheme and Evaluation</u></b>: There would be three types of assessment for evaluating the performance of the participants - short and long answer questions, multiple type questions and practical exercises. Each participant will be given assignments and projects. After completion of the training, online examination will be conducted and Certificate will be jointly issued by Pinnacle Infotrain and Jain University only after completion of all the assignments, project and after qualifying the exam.</p>	
		<p>8. <b><u>Procedure for admission, Curriculum transaction and evaluation</u></b>: Admission will be based on prerequisite degree of any recognized universities in India. The Course is affiliated to the Jain University.</p>	
		<p>9. <b><u>Fee structure</u></b>: The fees should be paid in lump sum or in installment only, before the commencement of the course*. Rs. 58000/-  *Installment options can be provided with additional 8% on the course fees. The students can pay it in 4 easy installments</p>	

## **10. Syllabus:**

### **Module-1: Manual Testing**

Software Development Life Cycle:

What are the different phases of SDLC?

How does the process of Software Development Start?

Project Initiation

Requirement Gathering and Analysis

What is Requirement document and what it contains?

What is use case document and what it contains?

What is Basic path and Alternate Path?

Role of Business Analyst

Example for explaining each phase

Role of technical specification team

What is technical specification document?

What is System Design?

Role of Design team

What is design document?

Role of architecture team

System development

Role of development team

Deliverable of Development phase

System testing

Role of testers and types of testing

User acceptance testing

System deployment

System maintenance

Events in the maintenance phase like bug fixes

Software Testing Life Cycle

How are the phases of STLC carried out?

What is testing?

Role of testers

Why do we need to test?

What is test plan and test case document?

Steps of test case execution

What does test case document contain?

How to write test case document?

What is required to test any application?

TEST CASES

What is test case?

What does test case document contain?

How to write test case document?

Different test case techniques  
TEST PLAN

What is Test Plan?  
How to write test plan document?  
What does the test plan document contain?  
Who writes and approves the test plan document?  
How manage the test case documents?  
What is the pass/fail criterion?  
TYPES OF TESTING

Different Phases of testing  
What is unit testing?  
What is Minimum acceptance testing?  
What is integration, system and system integration testing?  
What is User acceptance testing?  
What is Regression Testing?  
DEFECT ANALYSIS

What is a defect?  
Various Defect tracking tools  
How to use the defect tracking tools?  
How to enter the details of defect in the defect tracking tool?  
How to identify a defect?  
What is severity and priority?  
TRACEABILITY MATRIX

What is Traceability Matrix[TM]?  
Who Prepares the TM document?  
What is the reference for writing TM?  
What is the use of TM?  
What is present in the TM document?  
Sample TM

**Module-2:**

**Option-1**

**Automation Testing Selenium with Java**

Introduction to Selenium  
Need of Test Automation  
Why Open-Source Test Automation  
Introduction to Various tools of Test Automation  
Introduction of Selenium  
Selenium Components

Java Concepts  
Introduction to Java  
Setting Development Environment - Eclipse  
Walk through of Java concepts  
Introduction to Java Data Types

		<p> Taking Input from End User  Numerical Data Type and Numerical Operators  Boolean Data Type and Operators  Conditional Statements [IF], and Loop [While]  Conditional Statement [SWITCH]  Loop [FOR]  String Data type and functions  Command Line Parameters  Arrays  Hash Tables/ Map Object  Regular Expression  File Handling  Java OOPs Concept  Concept of Classes and Objects in Java  Java Programs  Concept of Packages in Java  Exception Handling  Debugging in Java </p> <p> Selenium WebDriver  Overview of WebDriver  Introduction to browser specific drivers  Setup WebDriver package on system for eclipse  Set up firebug for Firefox  Exporting pre-recorded test scenario in IDE to  WebDriver, and executing it.  Web-driver class files, and their methods  Automating different HTML Elements text fields, buttons,  links, check box,  drop-down etc.  Verifications and Assertions  Parameterization  Synchronization  Desired Capabilities and IE  Handling Web Table  Handling Drop Down elements  SwitchTo Command -Handling Frames, Popup Windows,  Alerts </p> <p> POM  Introduction to Page Object Model  Usage of Page Object Model for DemoSite  Introduction to JUnit  Introduction to various Java APIs – Log4J, Apache POI,  XML Beans.  Quick Snapshot- Create Logs  Quick Snapshot- Read and Write to Excel Files </p> <p> Maven  What is Maven and Why Maven?  Installing/Configuring Maven  Archetypes in Maven </p>	
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	<p>Creating maven project through command line POM.xml Importing Archetypes Maven Repositories Importing the maven project into eclipse Building a selenium project and running it through Maven</p> <p>Framework What is Framework and Types of Frameworks</p> <p><b><u>Option-2:</u></b> <b><u>Automation Testing Selenium with C#</u></b> Introduction to Automation</p> <p>What is automation testing Advantages of Automation Testing How to learn any automation tool Types of Automation tools</p> <p>Introduction to Selenium What is Selenium Use of Selenium Features of selenium Difference between Selenium and QTP</p> <p>Selenium Components Selenium IDE Selenium RC Selenium 2.0 – Web Driver Selenium Grid</p> <p>Working with Selenium WebDriver API Checking an element's text Checking an element's attribute values Checking an element's CSS values Using Advanced User Interactions API for mouse and keyboard events Performing double-click on an element Performing drag-and-drop operations Executing JavaScript code Capturing screenshots with Selenium WebDriver Capturing screenshots with RemoteWebDriver/Grid Maximizing the browser window Automating dropdowns and lists Checking options in dropdowns and lists Checking selected options in dropdowns and lists Automating radio buttons and radio groups Automating checkboxes</p> <p>Controlling the Test Flow Synchronizing a test with an implicit wait</p>	
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Synchronizing a test with an explicit wait  
Synchronizing a test with custom-expected conditions  
Checking an element's presence  
Checking an element's status  
Identifying and handling a pop-up window by its name  
Identifying and handling a pop-up window by its title  
Identifying and handling a pop-up window by its content  
Handling a simple JavaScript alert  
Handling a confirm box alert  
Handling a prompt box alert  
Identifying and handling frames  
Identifying and handling frames by their content  
Working with IFRAME

#### Data-Driven Testing

Introduction

Reading test data from an Excel file

#### How to use NUnit in Selenium

Introduction to Nunit

Why Nunit

Setting up Nunit

Working with Nunit

Advantages of Nunit

Exploring Nunit Features

How to Use Nunit Attributes

Data Driven Testing Nunit

Nunit Execution Report

Nunit Results output folder walkthrough

Nunit Reporting features

#### **Option-3:**

#### **Automation Testing tool Selenium with Python**

Introduction to Selenium

- What is Automation Testing?
- Why need for Automation Testing for Applications?
- Benefit and Features of Automation Testing
- Automation Testing Tools in Market
- Explaining about Selenium
- Selenium Component and Features
- Selenium Architecture · Selenium vs QTP
- Explaining about IDE, Selenium WebDriver, Selenium-Grid
- Explaining Supporting Languages in Selenium
- Why Choose Python Over Java

Getting Start with Python

- What is Python?
- How to install Python
- Basic Programming on Python
- How to Write and Execute Simple Python program
- Variables and Scope

- Data Types in Python
- Logical Operation
- Control Flows in Python
- Loop Statement
- Exceptional Handling
- Function and Procedure in Python
- File Operations in Python
- Explaining about Python Modules and Libraries
- How to use Modules in Script
- Standard Libraries and External Libraries
- Object Oriented Programming Supports in Python

#### Installation and Configuration

- Prerequisite for install Selenium
  - Installing Selenium IDE
  - Setting PyCharm
  - Eclipse plugin for PyDev
  - Chrome Setup
  - Internet Explorer Setup
- #### Selenium WebDriver
- Explaining about unittest library
  - How to Write Tests
  - Setup() Method, tearDown() Methods
  - Assertions
  - How to run the test
  - Test suites
  - How to generate HTML test reports

#### Locating Web Elements

- Explaining about Elements
- Inspecting pages and elements with Chrome and IE
- Locating elements by different options
- Locating elements by ID, XPath
- Locating elements By CSS Selector
- Locating elements By Class Name, Link Text and Name

#### Selenium API for Elements Interaction / Extracting

- Overview of HTML form Elements
- Understanding WebDriver Properties and Methods
- Web Elements Properties and Methods
- Working with forms, checkboxes and radio button
- Working with dropdowns and lists
- Working with alert and pop-up windows

#### Working with Windows and Frames

- iFrames
- Multiple Windows
- Windows Size and Location

#### Working with Synchronizing Tests

- Explaining about Synchronizing Test
- Using Implicit Wait

- Using Explicit Wait
- Waiting for alerts
- custom wait conditions

#### Advanced Selenium WebDriver

- Overview of WebDriver
- Keyboard actions
- DoubleClick and drag\_and\_drop method
- Capturing screenshots of failures
- Handling pop-up windows
- How to Managing cookies

### **Module-3: Performance Test using JMeter**

#### Introduction to JMeter

#### About JMeter

#### Installation & Running

#### Introducing the JMeter GUI

#### Configuring JMeter

#### JMeter Features

#### JMeter Test Plan

#### What is a Test Plan?

#### Elements of a Test Plan

#### Building a Test Plan that Tests Web Sites

#### Building a Database Test Plan

#### Executing your Test Plan

#### Reading Results of Test Plan

#### Jmeter Listeners

#### What are Listeners

#### Different Types of Listeners

#### JMeter Functions and User Variables

#### Creating User Variables

#### Getting Data from Website

#### Using JMeter Functions

#### Function helper

#### Using JMeter proxy server

#### Parameterising Tests in Jmeter

#### Using Regular Expressions in Jmeter

#### Remote & Distributed Testing in Jmeter

#### Preparing Remote Environment

#### Running Distributed

#### Gathering and Analysing Results

#### Using Distributed Testing with Load Balancers

#### Resource Monitoring in Jmeter

#### CPU Usage

#### Memory and Disk I/O Usage

#### Web & Application Server Performance

#### Business Process Performance

#### Database Performance

#### Network Traffic

#### Analysing & Understanding JMeter Results

		<p><b><u>Moduel-4: Security Test</u></b>  Introduction to Security Testing  History of information security  The software security problem  Understanding risk  Security testing approaches  Security testing framework  Security Testing Prior to Development  Security policy and standards  Secure software development process  Security Testing During Definition and Design  Security requirements  Architecture and design reviews  Threat modeling  Security test planning  Security Testing During Implementation  Secure code review  Security testing features and functions  Security testing interfaces and exceptions  Understanding and Testing Security Controls  Authentication and access control  Input validation and encoding  Encryption  User and session management  Error and exception handling  Audit and logging</p> <p><b><u>Module-5: API Testing</u></b>  Set-up of API Test environment  Types of Output of an API  Test Cases for API Testing  Approach of API Testing  Difference between API testing and Unit testing  What to test for in API testing  Best Practices of API Testing  Types of Bugs that API Testing detects  Tools for API Testing  Challenges of API Testing</p> <p><b><u>Projects: For 4 weeks-</u></b>  <b><u>Projects will be assigned to students with assistance in handling the projects.</u></b></p>	
		<p><b>12. Quality Assurance:</b>  IQAC (Internal Quality Assurance Cell) is in place to oversee the Programme delivery mechanism and suggest changes specific to industry requirements.</p>	

		<p>The quality of the programme will be ensured through strict monitoring by an executive committee including the Co-ordinator of the programme, the subject experts, Director. The Co-ordinator of the programme shall ensure the regular student feedback of courses, teachers and programme in the prescribed format towards the end of the semester and the same shall be analyzed to draw conclusions for effecting improvement.</p> <p>Periodical review meetings on the programme efficacy will be held in which the remarks of teachers on curriculum, syllabi and methods of teaching and evaluation will be given due importance. Moreover, the progress and the quality of the programme will be monitored by the Internal Quality Assurance Cell of Pinnacle Infotrain from the outcome and feedback of the learners as well as the proper documentation maintained in the Centre.</p>	
		<p><b>13. SLM:</b> Self-Learning Material is available in English</p>	