**Name of the Programme: MCA**
**Course code:CSA-610**
**Title of course: Software Testing**
**Number of Credits: 4 (2L-2T-0P)**
**Effective from AY: 2022-23**

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| **Prerequisites for the course** | Software Engineering, OOT, Web Technology, Agile Methodology | |
| **Objectives** | • Inculcate the concepts and skills related to testing and quality assurance<br>• To empower the learner to evaluate and select appropriate testing methods and tools<br>• Develop Test first approach to software development.<br>• Inculcate the concepts and skills related to testing and quality assurance.<br>• Use various tools for testing and test automation<br>• To empower the learner to evaluate and select appropriate testing methods and tools. | |
| **Content** | Fundamentals of testing: Test, test case, test case design<br>Levels of testing: Unit, Integration, system, Acceptance Testing<br>Types of testing: White box and black box, various techniques – Cyclomatic complexity, equivalence class partitioning, boundary value analysis<br>Functional and non-functional testing. | 8 hours |
| | Test Driven Development:<br>TDD frameworks and refactoring using Junit, pair programming | 8 hours |
| | Debugging approaches and principles, debugging guidelines | 4 hours |
| | Testing tools and frameworks for Web and App development: Selenium, Jmeter, Jira, Bugzilla, API testing, DB testing, | 4 hours |
| | Continuous Integrations and DevOPs | 2 hours |
| | Quality Assurance: Reviews, walkthroughs, quality frameworks | 4 hours |
| | **Tools to be discussed during Tutorial Slots -** | **10 * 3 = 30 hours** |
| | Test management tool: keep track of all the testing activity, fast data analysis, manage manual and automation test cases, various environments, and plan and maintain manual testing | 3 hours |
| | Bug tracking tool: commonly used bug tracking tools such as: Jira, Bugzilla | 3 hours |
| | Automated testing tool: how to change the manual test cases into a test script with the help of some automation tools.<br>commonly used automation testing tools: Selenium | 3 hours |
| | Performance testing tool: test the performance of the software or an application. Performance testing tools such as Apache JMeter, LoadRunner | 3 hours |
| | Cross-browser testing tool: to test application on multiple browsers , perform compatibility testing through various browsers by using cross-browser testing tools such as LambdaTest, Sauce Labs | 3 hours |
| | Integration testing tool: test the interface between modules and find the bugs.<br>Some of the most used integration testing tools :<br>Citrus, FitNesse | 3 hours |
| | Unit testing tool using Junit/NUnit/phpunit and refactoring tools | 3 hours |

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| | Mobile/android testing tool to check the usability, functionality, security, and consistency of the application.<br>Use of tools of mobile testing such as Appium | 3 hours |
| | GUI testing tool<br>GUI testing:Navigation validation, verify the check screens, data integrity validation, verification of usability situations, and also check the numeric, date field formats. | 3 hours |
| | Security testing tool authorization, confidentiality, authentication, and availability types of aspect SonarQube<br>ZAP | 3 hours |
| **Pedagogy** | Classroom/handson instructions, assignments, mini projects.<br>Demo of tools, Classroom/handson instructions, assignments, mini projects | |
| **References/ Readings** | 1. Agile Java: Crafting Code with Test-Driven Development, Prentice Hall; 1st edition, 2005<br>2.A Practitioner's Guide to Software Test Design, Lee Copeland, Artech House<br>3. Refactoring: Improving the Design of Existing Code by Martin Fowler, Pearson, 2009<br>4. Code Complete- Steve McConnel, Microsoft Press US; 2nd edition, 2004<br>Websites and online tutorials | |
| **Course Outcomes** | At the end of the course, the students will be able to –<br>1. design test cases<br>2. apply agile and lean principles in software design<br>3. configure and use various test automation tools<br>4. adopt best practices in software testing and quality assurance<br>5. use testing tools for all aspects of software testing<br>6. evaluate and select appropriate tools for a software project | |

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