NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0910
Course Title:	Software Testing and Validation
Course Type:	(☐ Core/ ☐ Value Added Course / **√ Department Elective** / ☐ Institute Elective/ ☐ University Elective/ ☐ Open Elective / ☐ Any other)
Year of Introduction:	2022-23

L	T	Practical Component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to –

1. interpret different types of testing techniques in depth (BL2)
2. apply different software testing strategies in relation to software development (BL3)
3. evaluate modern software testing tools to support software testing projects (BL5)
4. design test project, test cases and test data, conduct test operations and generate testing report (BL6)

Syllabus: **Total Teaching hours: 30**

Unit	Syllabus	Teaching hours
Unit-I	**Overview of Software Testing:** Software Quality, Role of testing, testing approaches **Unit Testing:** Concept of Unit Testing, Defect Prevention, Static and Dynamic Unit Testing, Mutation Testing, Debugging **Control Flow Testing:** Control Flow Graph, Paths in a Control Flow Graph, All-Path Coverage Criterion, Statement Coverage Criterion, Branch Coverage Criterion **Data Flow Testing:** Data Flow Anomaly, Data Flow Graph, Data Flow Testing Criteria, Feasible Paths and Test Selection Criteria	10
Unit-II	**System Integration Testing:** System Integration Techniques, Types of Interfaces and Interface errors, Software and Hardware Integration, Off the shelf component Testing **System Test Categories:** Basic Tests, Functionality Tests, Robustness Tests, Interoperability Tests, Performance Tests, Scalability Tests, Stress Tests, Load and Stability Tests, Reliability Tests, Regression Tests, Documentation Tests **Functional Testing:** Equivalence Class Partitioning, Boundary value Analysis, Decision Tables, Random Testing, Error guessing, Category Partition	10

Unit-III	**System Test Design:** Test Design Factors, Requirement Identification, Characteristics of Testable Requirements, Test Design Preparedness Metrics, Test Case Design Effectiveness **System Test Planning, Execution and Automation:** Structure of a System Test Plan, Metrics for tracking System Test, Beta Testing, System Test Automation, System Test Report, Measuring Test Effectiveness	05
Unit-IV	**Acceptance Testing:** Types of Acceptance Testing, Selection of Acceptance Criteria, Acceptance Test Execution **Verification and Validation:** Planning Verification and Validation, The V-Model, Software Inspections, Automated Static Analysis, Verification and Formal Methods	05

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:

1. Sagar Naik University of Waterloo, Piyu Tripathy, Software Testing and Quality Assurance: Theory and Practice, Wiley
2. William Perry, Effective Methods for Software Testing, Wiley
3. Srinivasan Desikan and Gopalaswamy Ramesh, Software Testing, Pearson Education
4. Glenford J. Myers, The Art of Software Testing, John Wiley & Sons
5. Paul C. Jorgensen, Software Testing - A Craftsman's Approach, CRC Press

Suggested List of Experiments:

Sr. No.	Title	Hours
1	To analyze given webpages from user interface, functionality, and security perspective, and perform manual testing	02
2	To study and perform sample tests using Test Link Testing tool.	02
3	To study and perform sample tests using J-Unit Testing tool.	02
4	To study and perform sample GUI tests using Selenium Testing tool.	04
5	To perform performance load testing using any open-source tool.	04
6	To perform regression testing using any open-source tool.	02
7	To perform software testing using formal methods.	04

Suggested Case List: -NA-