# 19CS42E1 - SOFTWARE TESTING AND QUALITY ASSURANCE

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| **Course Category:** | Professional Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Knowledge of Software Engineering basics is required | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | * To understand various types ofsoftware testing techniques * To gain knowledge about manual and automated testing methods. * To study of different Software quality assurance standards and maturity models. | | |

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| **Course Outcomes** | Upon the successful completion of the course, the students will be able to: | |
| CO1 | Understand the Unit and Control flow testing concepts and applicability. |
| CO2 | Acquire knowledge on Data flow and Domain testing concepts to apply for software project. |
| CO3 | Apply System integration testing and System test design issues for modules. |
| CO4 | Get the idea of System test planning, automation and execution. |
| CO5 | Gain the knowledge in Acceptance testing and software reliability. |
| CO6 | Apply various Maturity models to improve quality in software development. |
| **Course Content** | UNIT-I  **Unit Testing:** Concept of Unit testing, Static Unit testing, Defect Prevention, Dynamic Unit testing, Mutation testing, Debugging, Unit testing in eXtreme programming, JUnit:Framework for unit testing, Tools for unit testing.  **Control Flow Testing:** Outline of control flow testing, Control flow graph, Paths in a control flow graph, Path selection criteria, and Generating test inputs.  UNIT-II  **Data Flow Testing:** Data flow anomaly, Overview of dynamic dataflow testing, Data flow graph, Data flow terms, Data flow testing criteria, Comparison of data flow test selection criteria, Comparison of testing techniques.  **Domain Testing:** Domain error, Testing for Domain errors, Sources of domains, Types of domain errors, ON and OFF points, Test selection criterion.  UNIT-III  **System Integration Testing:** Concept of Integration testing, Different types of Interfaces and interface errors, Granularity of system integration testing, System integration techniques, Software and Hardware integration, Test plan for system integration, Off-the –shelf component integration.  **System Test Design:** Test design factors, Requirement identification, Characteristics of Testable requirements, Test objective identification, Modeling a test design process, Modeling test results.  UNIT-IV  **System Test Planning and Automation:** Structure of a system test plan, Assumptions, Test approach, Test suite structure, Test environment, Test execution strategy, Test effort estimation, Scheduling and Test milestones, System test automation, Evaluation and selection of test automation tools, Test selection guidelines for automation.  **System Test Execution:** Basic ideas, Modeling defects, Metrics for tracking system test, orthogonal defect classification, defect casual analysis, Beta testing, system test report.  UNIT-V  **Acceptance Testing:** Types of acceptance testing, Acceptance criteria, Selection of acceptance criteria, Acceptance test plan, Acceptance test execution, Acceptance test report, Acceptance testing in eXtreme programming.  **Software Reliability:** What is Reliability? Definitions of Software Reliability, Factors influencing software reliability, Applications of software reliability, Reliability models.  UNIT-VI  **Software Quality:** Five views of software quality, McCall’s quality factors and criteria, ISO 9126 Quality characteristics, ISO 9000:2000 Fundamentals, ISO 9000:2000 Requirements.  **Maturity Models:** Basic idea in software process, CMMI architecture, Five levels of maturity and key process areas, Common features of key practices, Application of CMM, Capability Maturity Model Integration, Test process improvement, Testing Maturity Model. | |
| **Text Books and References** | **TEXT BOOKS:**   * 1. Software Testing and Quality Assurance: Theory and Practice by KshirasagarNaik, PriyadarshiTripathy, Wiley Publications.   **REFERENCE BOOKS:**   * 1. Software quality assurance – from theory to implementation by Daniel Galin, Pearson education, 2009.   2. Foundations of software testing by AdityaMathur, Pearson Education, 2008   3. Software testing – principles and practices by SrinivasanDesikan and Gopalaswamy Ramesh, Pearson education, 2006   4. Software testing by Ron Patton, second edition, Pearson education, 2007   5. Software Quality Theory and Management by Alan C Gillies, CengageLearning, Second edition, 2003 | |
| **E-Resources** | * 1. [https://nptel.ac.in/courses](about:blank)   2. [https://freevideolectures.com/university/iitm](about:blank) | |