

# SOFTWARE QUALITY ASSURANCE AND TESTING

## VI SEMESTER: CSE & CSIT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACIC02	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes:45			

**Prerequisites:** Object Oriented Software Engineering

## I. COURSE OVERVIEW:

Software Quality and Testing refers to practical approach to software testing as a sub-discipline of software engineering. It introduces software quality concepts, standards, measurements, and practices that support the production of quality software. It offers a solid foundation in testing fundamentals including test case design, test management, and test measurement strategies, which improve the effectiveness of software test processes.

## II. COURSE OBJECTIVES:

**The students will try to learn:**

- I. The software testing and quality assurance as a fundamental component of software life cycle.
- II. Describe fundamental concepts of software quality assurance.
- III. How to use software quality tools and analyze their effectiveness.
- IV. The quality management, assurance, and quality standard to software system.

### III. COURSE OUTCOMES:

**After successful completion of the course, students should be able to:**

CO 1	<b>Demonstrate</b> the power of wide variety of testing techniques in developing qualitative software as per customer needs	Understand
CO 2	<b>Make use of</b> various system testing strategies at various levels for analyzing likelihood of faults and generating defect free software product	Apply
CO 3	<b>Utilize</b> Testing plans and procedures for developing effective softwareproduct	Apply
CO 4	<b>Analyze</b> automated Testing models for evaluating correctness of realtime software systems	Analyze
CO 5	<b>Illustrate</b> the importance of standards in the quality management process and their impact on the final product	Understand
CO 6	<b>Inspect</b> Quality assurance tools techniques to manage Risk and assessquality of software developed for engineering applications	Analyze

#### IV. SYLLABUS:

**MODULE – I: SOFTWARE TESTING, CONCEPTS, ISSUES, AND TECHNIQUES (10)**

Quality revolution, verification and validation, failure, error, fault, and defect, objectives of testing, testing activities, test case selection white-box and black box, test planning and design, test tools and automation, power of test, test team organization and management, test groups, software quality assurance group, system test team hierarchy, team building.

**MODULE – II: SYSTEM TESTING (10)**

System testing, system integration techniques, incremental, top-down bottom-up sandwich and big bang, software and hardware integration, hardware design verification tests, hardware and software compatibility matrix test plan for system integration. built, in testing. functional testing, testing a function in context. boundary value analysis, decision tables, acceptance testing, selection of acceptance criteria, acceptance test plan, test execution test. software reliability, fault and failure, factors influencing software, reliability models.

## **MODULE – III: SYSTEM TEST CATEGORIES (09)**

Taxonomy of system tests, interface tests, functionality tests; GUI tests, security tests feature tests, robustness tests, boundary value tests power cycling tests interoperability tests, scalability tests, stress tests, load and stability tests, reliability tests, regression tests, regulatory tests.

Test generation from FSM models, State-Oriented Model, Finite-State Machine Transition Tour Method, testing with state verification, test architectures, local, distributed, coordinated, remote, system test design, test design factors requirement identification, modeling a test design process test design preparedness, metrics, test case design effectiveness; System test execution, modeling defects, metrics for monitoring test execution, defect reports, defect causal analysis, beta testing, measuring test effectiveness.

#### **MODULE – IV: SOFTWARE QUALITY (08)**

Software quality, People's Quality Expectations, Frameworks and ISO, 9126, McCall's Quality Factors and Criteria – Relationship, Quality Metrics, Quality Characteristics ISO 9000:2000 Software Quality Standard; Maturity models: Test Process Improvement, Testing Maturity Model.

#### **MODULE– V: SOFTWARE QUALITY ASSURANCE (08)**

Quality Assurance, Root Cause Analysis, modeling, technologies, standards and methodologies for defect prevention; Fault tolerance and failure containment, safety assurance and damage control, hazard analysis using fault-trees and event-trees. Comparing quality assurance techniques and activities; QA monitoring and measurement, risk identification for quantifiable quality improvement; Case Study: FSM-Based Testing of Web-Based Applications.

#### **V. TEXT BOOKS:**

1. Kshira Sagar Naik Priyadarshi Tripathy, “Software Testing and Quality Assurance-Theory and Practice”, John Wiley & Sons Inc, Wiley Student Edition, 2010.
2. Jeff Tian, “Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement”, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.

#### **VI. REFERENCE BOOKS:**

1. Daniel Galin, “Software Quality Assurance - From Theory to Implementation”, Pearson Education Ltd UK, 2004.
2. MilindLimaye, “Software Quality Assurance”, TMH, New Delhi, 2011.

#### **VII. WEB REFERENCES:**

1. <https://www.cigniti.com/e,books/>
2. <http://desy.lecturer.pens.ac.id/>
3. <http://aagasc.edu.in/>