

Software Testing & Quality Assurance

B.E. Sem. VII [INFT]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

Prerequisite: Software Engineering

Objective : This course equips the students with a solid understanding of

- Practices that support the production of quality software
- Software testing techniques
- Life-cycle models for requirements, defects, test cases, and test results
- Process models for units, integration, system, and acceptance testing
- Quality Models

SYLLABUS

1. Introduction

Software Quality, Role of testing, verification and validation, objectives and issues of testing, Testing activities and levels, Sources of Information for Test Case Selection, White-Box and Black-Box Testing , Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management .

2. Unit Testing

Concept of Unit Testing, Static Unit Testing , Defect Prevention , 3.4 Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in eXtreme Programming

3. Control Flow Testing

Outline of Control Flow Testing, Control Flow Graph, Paths in a Control Flow Graph, Path Selection Criteria, All-Path Coverage Criterion , Statement Coverage Criterion, Branch Coverage Criterion, Predicate Coverage Criterion, Generating Test Input, Examples of Test Data Selection.

4. Data Flow Testing

Data Flow Anomaly,. Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria, Comparison of Testing Techniques.

5. 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, Off-the-Shelf Component Testing, Built-in Testing.

6. 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.

7. Functional Testing

Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing, Error Guessing, Category Partition.

8. System Test Design

Test Design Factors, Requirement Identification, Characteristics of Testable Requirements, Test Design Preparedness Metrics, Test Case Design Effectiveness.

9. System Test Planning And Automation

Structure of a System Test Plan, Introduction and Feature Description, 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, Characteristics of Automated Test Cases, Structure of an Automated Test Case, Test Automation Infrastructure.

10. System Test Execution

Preparedness to Start System Testing, Metrics for Tracking System Test, Metrics for Monitoring Test Execution, Beta Testing, First Customer Shipment, System Test Report, Product Sustaining, Measuring Test Effectiveness.

11. 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.

12. Software Quality

Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, ISO 9126 Quality Characteristics, ISO 9000:2000 Software Quality Standard ISO 9000:2000 Fundamentals, ISO 9001:2000 Requirements.

Reference :

1. Software Testing and Quality Assurance: Theory and Practice (*Sagar Naik*) University of Waterloo, Piyu Tripathy, Wiley , 2008
2. Effective methods for Software Testing (*William Perry*) Wiley.
3. Software Testing - A Craftsman's Approach (*Paul C. Jorgensen*) CRC Press, 1995.
4. The Art of Creative Destruction (*Rajnikant Puranik*) SPD.
5. Software Testing (*Srinivasan Desikan and Gopalaswamy Ramesh*) Pearson Education 2006.
6. Introducing to Software Testing (*Louis Tamres*) Addison Wesley Publications, First Edition.
7. Software Testing (*Ron Patton*) SAMS Techmedia Indian Edition, Pearson Education 2001.
8. The Art of Software Testing (*Glenford J. Myers*) John Wiley & Sons, 1979.
9. Testing Object-Oriented Systems : Models Patterns and Tools (*Robert V. Binder*) Addison Wesley, 2000.
10. Software Testing Techniques (*Boris Beizer*) 2nd Edition, Van Nostrand Reinhold, 1990.
11. Software Quality Assurance (*Daniel Galin*) Pearson Education.

