

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER SCIENCE & ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Software Testing and Quality (Department Elective -I)**

Subject Code: **173102**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	Basic Concepts of Testing and Quality: Software Quality, Errors, Correctness, Faults and Failures, Role and objectives of Testing, Test automation, Test case and its preparation, Correctness of Program, Software Testing metrics, Software testing metrics, development & testing phases in V model, Sources of Information for test case selection, Overview of CFG, Overview of string, languages and regular expressions, Types of testing –Black Box, White Box, Model Based, Interface, Unit testing, System Testing, Regression, Beta testing etc.	07
2.	Unit Testing: Concept, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation testing, Debugging, Tools for Unit Testing	03
3.	Control Flow Testing: Introduction, CFG, Paths and their Selection Criteria, Generating Test input, Examples of test data selection, Containment of infeasible paths	03
4.	Data Flow Testing: Introduction, Anomaly of data flow, DFG, DF Testing criteria, Data Flow Test Selection Criteria comparison, Feasible Paths and test selection criteria,	03
5.	Domain Testing: Domain Error, Testing for domain error, Sources of domains, Types of domain errors, ON and OFF points, Test Selection criterion	04

6.	System Integration Testing: Introduction, Types of interface and types of interface errors, System integration techniques, Integration of software and hardware, Test Plan, Off-the-shelf component integration testing	04
7.	Test Generation from FSM models: State oriented model, Points of control, FSM, Test generation from FSM, W-method, UIO method, Distinguishing and characterizing sequence, Test architectures, Extended FSM, Test generation	07
8.	System Test categories: Introduction, Basic tests- Boot, Upgrade-downgrade, LED, Diagnostic, Command line i/f Functionality tests- Communication System, Module, Log and Trace, GUI, Security Robustness tests – Boundary value, Power cycle, Online Insertion and removal Interoperability test, Performance test, Scalability test, Stress test, Load and stability test, regression test, Documentation test	07
9.	Functional testing: Introduction, Complexity, Pair-wise testing, Equivalence class partitioning, boundary value analysis, decision tables, random testing, category partition	03
10.	System test design: Factors, Requirements Identification, Characteristics of testable requirements, Identification of test objectives, Modeling a test design process, modeling test results	04
11.	System Test Planning: Introduction, Assumptions, test Environment and structure, Test execution strategies, test effort estimation, Scheduling and test milestones	03
12.	System test execution: Introduction, Modeling Defects, Metrics for Tracking system test, Orthogonal defect classification, defect causal analysis, Beta testing	03
13.	Software Quality: Introduction, Different views of quality, Measurement of quality, Quality factors- correctness, reliability, efficiency, testability, portability, reusability etc. Quality criteria and relationship with factors	03

Text Books:

1. "Software Testing & Quality Assurance" by Kshirsagar Naik and Priyadarshi Tripathy, Wiley Student edition
2. "Foundations of Software Testing" by Aditya P Mathur, Pearson, Fourth print year 2011
3. "Introducing Software testing- A practical guide to getting started", Louise Tamres, Pearson

Reference Books:

1. "Rapid Testing" by Robert Culbertson, Chris Brown and Gary Cobb; Prentice-Hall, 2002. ISBN 0-13-091294-8
2. "Black-Box Testing: Techniques for Functional Testing of Software and Systems", by Boris Beizer, John Wiley & Sons, Inc., 1995. ISBN# 0-471-12094-