Program: Final Year B.Tech. in Computer Engineering						Semester: VIII			
Course: Software Testing and Quality Assurance						Course Code: DJ19CEEC8013			
Course: Software Testing and Quality Assurance Laboratory						Course Code: DJ19CEEL8013			

Teaching Scheme (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)	Continuous Assessment Marks (B)			Total marks = (A+ B)	
Lectures	Practical	Tutorial	Total Credits	Theory	Term Test 1	Term Test 2	Avg.		
				75	25	25	25	100	
				Laboratory Examination	Term work		Total Term work		
				Oral	Practical	Oral &Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	
3	2	-	4						50
				25	-	-	15	10	25

Pre-requisite: Software Engineering

Course Objectives: This course equips the students with a solid understanding of:

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

Outcomes: On successful completion of course learner will be able to:

1. Use various Software testing techniques to produce quality software.
2. Identify Learn Life-cycle models for requirements.
3.   Design process models for units, integration, system, and acceptance testing
4.   Identify various Quality Models.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
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, Introduction to Testing techniques, Introduction to Testing strategies, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.	**04**
2	**System testing techniques and strategies:** **Unit Testing:** Concept of Unit Testing, Static Unit Testing**,** Defect Prevention, Dynamic Unit Testing**,** Mutation Testing**,** Debugging**,** Unit Testing in eXtreme Programming **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. **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.	**08**
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. **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.	**10**
4	**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. **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. **Functional Testing:** Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing, Error Guessing, Category Partition. **System Test Design:** Test Design Factors**,** Requirement Identification, Characteristics of Testable Requirements, Test Design Preparedness Metrics, Test Case Design Effectiveness.	**10**

5	**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	**06**
6	**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	**04**

Books Recommended:

Text books:

1."Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, University of Waterloo, Piyu Tripathy, Wiley, 2008.

2. Roger Pressman, ―Software Engineering: A Practitioners Approach", McGraw-Hill Publications,2011

Reference Books:

1."Effective methods for Software Testing "William Perry, Wiley.

2. "Software Testing - A Craftsman's Approach", Paul C. Jorgensen, CRC Press, 1995.

3. "The Art of Creative Destruction", Rajnikant Puranik, SPD.

4. "Software Testing", Srinivasan Desikan and Gopalaswamy Ramesh – Pearson Education 2006.

5. "Introducing to Software Testing", Louis Tamres, Addison Wesley Publications, First Edition.

6."The Art of Software Testing", Glenford J. Myers, John Wiley & Sons, 1979.

7. "Testing Object-Oriented Systems: Models Patterns and Tools", Robert V. Binder, Addison Wesley, 2000.

8. "Software Testing Techniques", Boris Beizer, 2nd Edition, Van Nostrand Reinhold, 1990.

9. "Software Quality Assurance", Daniel Galin, Pearson Education.

Suggested List of Experiments:

Sr. No.	Title of Experiments
1.	Prepare a test case verification document for a given scenario
2.	Detailed Test Plan in IEEE format for given case study
3.	White Box Testing on Units/Modules of Income Tax Calculator
4.	Black Box Testing on Units/Modules of Income Tax Calculator
6.	To design test cases for given problem statement based on Decision Table Testing method
7.	Study of Automation Software Testing with JUnit
8.	To study software Automation Testing with JMeter
9.	To study software Automation Testing tool WinRunner for Setting Up the GUI Map
10.	To study software Automation Testing tool WinRunner for Checking GUI Objects
11.	To study software Automation Testing tool WinRunner Creating Data-Driven Tests

Evaluation Scheme:

Semester End Examination (A):

Theory:

> 1. Question paper based on the entire syllabus, summing up to 75 marks.

> 2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

> Oral examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average marks scored in the two tests will be considered for final grading.

Laboratory: (Term work)

Laboratory work will be based on **DJ19CEEL8013** with a minimum of 08 experiments to be incorporated.

The distribution of marks for term work shall be as follows:

I. Laboratory work (Performance of Experiments): 15 Marks
II. Journal Documentation (Write-up and Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by   Checked by   Head of the Department   Principal