



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: Computer Engineering

Course / Subject Code : 3164901

CC Course / Subject Name : Software Engineering and Testing

w. e. f. Academic Year:	2024-2025
Semester:	6 th
Category of the Course:	PCC

Prerequisite:	NA
Rationale:	To study Software Development Life Cycle, Development models and Agile Software development. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing. To Design, Develop and write Test Plan & Test Cases.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Able to understand various SDLC models .	R
02	Able to Prepare SRS (Software Requirement Specification) document and Apply the concept of Functional Oriented and Object Oriented Approach for Software Design	A
03	Recognize how to ensure the quality of software product, different software quality components and software quality metrics.	U
04	Apply the concepts in preparing the quality plan & documents	A
05	Apply various testing techniques and test plan for different systems.	A

*Revised Bloom's Taxonomy (RBT)



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Teaching and Examination Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
4	0	2	5	70	30	20	30	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Unit-1: Introduction to Software and Software Engineering The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process. Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.	11	20%
2	Unit-2: Managing Software Project Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management (Risk Identification, Risk Projection, Risk Refinement , Risk Mitigation).	08	15%
3	Unit-3: Requirement Analysis and Software Design Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering, Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design), User Interface Design.	08	15%



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4	Unit-4 : Introduction to software Quality and Assurance The software quality challenge, Software quality ,Software quality factors Management and its role in software quality assurance, Software Quality metrics. SQA Components in the Project Life Cycle and Strategies The components of the software quality assurance system– overview, Integrating quality activities in the project life cycle.	08	15%
5	Unit-5 : DevOps: Overview, Problem Case Definition, Benefits of Fixing Application Development Challenges, DevOps Adoption Approach through Assessment, Solution Dimensions, What is DevOps?, DevOps Importance and Benefits, DevOps Principles and Practices, 7 C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, How to Choose Right DevOps Tools, Challenges with DevOps Implementation.	09	15%
6	Unit-6 : Software Testing The Testing Process, Test Case Design, Automated Testing, Testing Life Cycle, Software testing–strategies ,Black Box Testing and White Box Testing. software testing issues and testing types like software unit test; integration, regression, and system testing. CASE tools and their effect on software Quality.	10	20%
Total		48	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20	30	40	10	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Roger S. Pressman, Software Engineering- A practitioner's Approach, McGraw-Hill International Editions



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2. Ian Sommerville, Software engineering, Pearson education Asia
3. The complete animation course by Chris Patmore -Baron's Educational Series. (New York)

3. Kshirsagar Naikand Priyadarshi Tripathy, Software Testing & Quality Assurance- Theory and Practice, Wiley Student edition

(b) Open source software and website:

List of e-Learning Resources:

1. <https://www.javatpoint.com/selenium-tutorial>
2. <https://www.softwaretestinghelp.com/selenium-webdriver-commands-selenium-tutorial-17/http://toolsqa.com/selenium-webdriver/>
3. <http://www.opensourcetesting.org/>
4. <http://www.onestoptesting.com/>

1. Cengage India Publication

Suggested Course Practical List: If any

1. Consider any project to be developed in any technology as a Software Architect or Project Manager. Construct Software Requirement Specification (SRS) document for the project.
2. Cost estimation using LOC, COCOMO and FP model of your current semester project.
3. System Design using procedural approach. Structure chart, Dataflow diagram (DFD), User interface (I/O) designing, component level design for current semester project.)
4. System design using object oriented approach. (Use case Dia., Class Dia., State Dia., for current semester project.)
5. System design using UML approach. Collaboration Dia., sequence Dia., Activity Dia. and Swim lane diagram for current semester project.
6. Study the Project management tool JIRA.
7. Generate the test cases for the Healthcare Web application with following modules:
 - a. Patient Registration
 - b. Scheduling
 - c. Treatment
 - d. Billing



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Write test cases using following techniques (Suggested)

a.Line Coverage using Cyclomatic Complexity

b.Boundary Value Analysis(BVA)

c.Equivalence Partition(EP)

d.Test Case Management Tools like JIRA (desirable)

8. Study of any any two Open-source tools in DevOps for Infrastructure Automation, Configuration Management, Deployment Automation, Performance Management, Log Management. Monitoring. (Chef, Supergiant, SaltStack, Docker, Kubernetes, Jenkins, etc)

9. Study the Testing tools Selenium for automated testing.

10. Study the Selenium Web Driver Commands

- Browser Commands
- Navigation Commands
 - Web Element Commands
 - Find Elements Command
 - CheckBox & Radio Button Operations
 - Drop Down & Multiple Select Operations
 - Handle Dynamic Web Tables in Selenium Web driver

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