GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: PG

Branch: Artificial Intelligence and Data Science

Subject Code: ME02095111

Course/Subject Name: Principles of Software Testing

WEF Academic Year	2024-25
Semester	2
Category of the Course	Professional Elective Course

Prerequisite:	Software testing course provides practical skills. It requires knowledge of discrete mathematics, programming, basics of software engineering and data structures.
Rationale:	• The course will focus upon to learn fundamentals of software testing effectively. • The course will focus upon the practical ways to design high quality tests during all phases of software development. • The course will focus upon the learning of theory behind criteria-based test design and to apply that theory in practice and how to test software in cutting-edge software development environments.

Course Outcome:

After completion of the Course, Students will be able to:

No	Course Outcomes	RBT Level*
01	Understand the concept of software testing with different models and architectures.	UN
02	Apply different software testing techniques for effective software development.	AP
03	Execute the effective software metrics and agile methodologies for defect management.	AP
04	Analyse the various software testing management tools in real time environment for robust software development.	AN
05	Evaluate the software testing methods by test management tools.	EL

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

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Teaching and Examination Scheme:

Teaching Scheme (in hours)			Total Credits (L+T+PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/Practical		
L	T	PR	C	ESE (E)	PA/CA (M)	PA/CA (I)	ESE (V)	
03	00	02	04	70	30	20	30	150

Course Content:

Unit	Course Content	No of Hours	% of Weightage
1.	**Introduction to Software Testing:** Need of software testing, Goal of software testing, what is Quality, Importance of testing, Tools for software Testing, Manual and Automation Testing, Principles of Software Testing, Software Development Life Cycle (SDLC).	04	10
2.	**Software Development Life Cycle Models and Architectures:** Waterfall Model, V Model, Spiral Model, Iterative Model, Agile Model, One-Tier Architectures, Two-Tier Architectures, Three-Tier Architecture, N-Tier Architecture	11	25
3.	**Unit Testing:** Boundary Value Testing, Equivalence Class Testing, Decision Table-Based Testing, Path Testing, Data Flow Testing, Retrospective on Unit Testing.	11	25
4.	**Beyond Unit Testing:** Life Cycle-Based Testing, Model-Based Testing, Integration Testing, System Testing, Object-Oriented Testing.	11	25

5.	**Current Trends of Software Testing:** Agile Testing, Test Automation: Selenium, UFT/QTP, Appium, Artificial Intelligence for Testing, Various Testing Management tools: JIRA, Bugzilla, qTest.	08	15
	TOTAL	**45**	**100**

Suggested Specification Table with Marks (Theory):

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

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

Reference/Suggested Learning Resources:

(a) Books:

1. Software Testing: A Craftsman's Approach by Paul C. Jorgensen, CRC Press, 2014.
2. Software Testing: Testing Across the Entire Software Development Life Cycle by Gerald D. Everett and Raymond McLeod, Jr., IEEE Press, Wiley, 2007.
3. Software Testing: Principles and Practices by Srinivasan Desikan and Gopalaswamy Ramesh, Pearson Education, @E, 2007.
4. Software Development From A to Z by Olga Filipova and Rui Vilão, Apress, 2018.
5. Managing the Testing Process: Practical Tools and Techniques for Managing Hardware and Software Testing, 3rd Edition by Rex Black, Wiley, ISBN: 978-0-470-40415-7, 2009.
6. Foundations of Software Testing by ADITYA P. MATHUR, 2E, Pearson Education, 2013.

(b) Open source software and website

- Course-related online MOOCs on NPTEL/SWAYAM platform.
- Recently Published papers/articles in reputed journals.

Suggested Course Practical List:

- The practical work will be carried out based on the content covered during the academic sessions**.**

List of Laboratory/Learning Resources Required: Programming development environment (open source is encouraged) related to the course content.

Suggested Project List: The subject teacher has to assign the relevant project work to the students in individual/team.

Suggested Activities for Students: The subject teacher has to assign the outcome based activities to the students in individual/team.

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