Course Code: CS5001   Course Title: Software Testing Techniques
Course Credits: 04   [Lectures: 04, Tutorial: 00, Practical: 04]
Prerequisites: Programming, Databases, Web Design, Web and Mobile Application Development

Prerequisites By Topics: Looping Constructs, Graph Theory, Resource allocation, Dynamic and Static declaration, Authentication, Web Elements and Locators, Fundamentals of Testing

Objectives: To familiarize the concepts of application testing, its types so as to design, configure and execute test cases that determines system performance and acceptability by evaluating test results.

Course Outcomes: Upon completion of the course, students shall be able to

CO1:	Describe the process of software testing with its levels and strategies.	Understanding
CO2:	Analyse, evaluate and use relevant testing techniques for an application.	Apply
CO3:	Design test plan for an application under test.	Understanding
CO4:	Determine, develop and execute test cases that asserts structural, functional, performance and acceptance aspects for an application under test through test automation tools..	Apply
CO5:	Analyse Test Report parameters and design retests for an application	Analysis

Course Objective and Outcome Mapping:
To familiarize the concepts application testing, its types –CO1, CO2
To design, configure and execute test cases that determines system performance and acceptability-CO3,CO4
To evaluating test results-CO5
Programme Outcomes:
PO1: Ability to understand the concepts of key areas in computer science.
PO2: Ability to design and develop system, component or process as well as test and maintain it so as to provide promising solutions to industry and society.
PO3: Effective communication and presentation skill.
PO4: Ability to understand professional and ethical responsibility.
PO5: Recognition of the need for life-long learning.

Programme Outcomes and Course Outcomes mapping:

Course Outcomes	Programme Outcomes				
	PO1	PO2	PO3	PO4	PO5
CO1	√				√
CO2	√			√	
CO3	√		√		
CO4	√	√			
CO5	√	√			

1   Software Test   [20 %]
   1.1.   Introduction and Key Terms
   1.2.   Types : Unit, Integration, System, Acceptance
   1.3.   Test Plan : Design Process and Mutation
   1.4.   Use Case to Test Case : Process, Scenario, Matrix
   1.5.   Unit Testing : Types Overview, Test Cases, Test Assertions
   1.6.   Test Suits : Introduction, Information Sources, Preparation and Selection
   1.7.   Test Execution : Monitoring and Measurement

2   System Testing   [15 %]

    2.1.   Characteristics, Types : Basic, Functional, Robust
    2.2.   Basic and Functional Tests: Types
    2.3.   Robust Tests : Overview, Types, Applicability
    2.4.   Regression Test : Need, Process, Usage, Test Automation

3   System Test Design   [15 %]

    3.1.   Test Design : Requirement Identification and Factors, Pre-requisite Metrics
    3.2.   Test Case Design, Entry and Exit Criteria
    3.3.   Test Environment : Configuration Process
    3.4.   Test Execution Parameters, Process and Automation
    3.5.   Test Result : Generation, Analysis, Retest

4   Acceptance Test   [15 %]

    4.1.   Key Terms, Types
    4.2.   Test Criteria Identification
    4.3.   Test Checklist Preparation
    4.4.   Test Plan : Design, Execution and Review,
    4.5.   Test Result Status

5   Testing Web Applications   [20 %]

    5.1.   Web Application Testing : Overview, Key Features, Types
    5.2.   User Interface Testing : Navigation, Form Based
    5.3.   Content Testing : Objectives and Test Strategy
    5.4.   Application Program Interface Testing : Introduction, Testing Web APIs, Web Services, Process
    5.5.   Configuration and Compatibility Testing

6   Mobile Application Testing   [15 %]

    6.1.   Mobile Application Testing: Introduction, Needs
    6.2.   Characteristics for Mobile Testing
    6.3.   Testing Types , Test Strategies : Device and Emulators
    6.4.   Component Testing : Activities, Services and Content Providers
    6.5.   Cross Platform testing : Process overview

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcomes				
		CO1	CO2	CO3	CO4	CO5
1	Software Test	✓		✓		
2	System Testing	✓	✓			
3	System Test Design		✓	✓	✓	✓
4	Acceptance Test		✓	✓	✓	✓
5	Testing Web Applications	✓		✓	✓	✓
6	Mobile Application Testing	✓			✓	✓

Computing Environment:

    CE#1 : JUnit and Citrus for Unit and Integration Test

    CE#2 : Katalon Studio for System, Web Testing and Mobile Testing

    CE#3 : Appium or Selenium for Acceptance Testing

Text Books/Material References :

1.   Yogesh Singh- Software Testing-Cambridge
2.   Naresh Chauhan-Software Testing Principles to Practice-Oxford

Reference

1.   Paul & Jeff-Introduction to Software Testing –Cambridge University Press.
2.   Pressman, R. S. -Software Engineering: A Practitioner's Approach -McGraw Hills.
3.   Kshirsagar & Priyadarshi–Software Testing and Quality Assurance: Theory and Practice-Wiley

Course Curriculum Execution Guidelines

Semester Objectives:

SO1: Enhance technical writing skill
SO2: Improve presentation skill
SO3: Promote contribution of students to share course related information
SO4: Develop system based problem solving skill

Content Delivery: *The course content shall be delivered by following pattern, wherein teacher must give approximately 75% hours exclusively for imparting conceptual knowledge. Rest 25% hours for demonstration/hands-on regarding supported tool and technology.*

Curriculum Enrichment Activity: Pre-requisites and Extension Topics to be covered on working Saturdays. Pre-requisites must be covered through conceptual discussion along with demonstration using tool, hands-on exercise and practice examples based on the nature of the topic.

Activity Type	Topics	Activity	Objective	During
Revision	**Fundamentals of Software Testing** 1. Types 2. Unit and Integration Testing Types 3. Hands on Unit Testing	Crash course of 3 hours	*To recaptivate pre-requisites* *tool related essentials*	1st Week of Semester
Bridge	**Test Automation** 1. Tool Relevancy 2. Test Automation Process 3. Test Execution 4. Report Generation and Analysis	Crash course of 6 hours	*To fulfil tool related essentials and pre-requisites required prior to beginning of Unit 2, 3, 4 and 6 of the course.*	3rd ,5th Week of Semester

Laboratory Guidelines

❖ A course teacher shall prepare a fresh practical list for each academic year with no repeated problems from previous two consecutive years.
❖ The practical problem list shall consists of "Required number of problems" for journal certification as well as "Practice problems" of varying nature from each unit as per its weightage and criticality.
❖ Laboratory supervisor or course teacher shall sign in the journal only if he/ she is satisfied by the work of student.
❖ Journal shall be verified by the laboratory teacher as well as by the course teacher at-least thrice in a semester at an interval of 10 laboratory sessions or an appropriate interval upon the discretion of the course teacher.
❖ Journal must not be certified if required number of problems are not included and not written clearly or copied.

- ❖ After approved by Course Co-ordinator, the List of problem definition shall be kept by concern teacher on web site before the commencement of the semester.
- ❖ Problem list shall contain practical problems from each of the units are as follow:

Unit No.	Required no. of problems to get the journal certified	Covering Unit / Sub-Unit
1	3	1.5
2	3	2.3, 2.4
3	2	3.2, 3.4, 3.5
4	2	4.5
5	2	5.2, 5.4
6	2	6.4,6.5
Total	14	

Assessment Parameters to evaluate Course Outcome and Semester Skills other than disseminated by Evaluation and Assessment Cell

1. AP1:Technical Report Preparation
2. AP2: Peer Critique
3. AP3: Literacy Log Book
4. AP4: Reflection Essay
5. AP5: MOOC Enrollment, Presentation and Assignment Submissions
6. AP6: Hand tool Development and Demonstration

Semester Skill	Assessment Parameter (with description)					
	AP1	AP2	AP3	AP4	AP5	AP6
SO1	√			√		
SO2		√			√	√
SO3			√	√	√	
SO4		√				√