SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU

LECTURE PLAN FOR THE ACADEMIC YEAR EVEN 2025 – 2026

Department of Information Science and Engineering

Teacher	**Mrs. Vidhya Shree N S**	**Dept.**	**Information Science and Engineering**
Class	**7th Semester - F section**	**Course**	**Software Testing (S7ISI02)**

Course Learning Objectives (CLOs): This course will make to student to:	
1	Understand the fundamental concepts of software testing.
2	Explain the life cycle of the testing and explore various levels of testing.
3	Gain knowledge on functional and structural testing methods.
4	Explore the concepts of software testing and its application in various scenarios with the help different testing strategies.
5	Understand and use testing tools and frameworks for various testing tasks.

Course Code	**Course Title**	**Teaching & Learning Scheme**							
		Classroom Instruction (CI) (in hrs / sem)		**Lab Instruction (LI) (in hrs / sem)**	**Self-Learning (SL) (in hrs / sem)**	**Term Work (TW) (in hrs / sem)**	**Assessment (hrs / sem)**	**Total no. of Hours per sem**	**Total Credits (C)* (Total Hours/30)**
		L	**T**	**P**	**SL**	**TW**	**A**		
S7ISI02	**Software Testing**	**42**	**-**	**28**	**14**	**29**	**7**	**120**	**4**

Sl. No.	**Date**	**Topic**	**Remarks**
		UNIT 1	
1.	1/9/2025	A Perspective on Testing, Examples: Basic definitions, Test cases,	
2.	2/9/2025	Insights from a Venn diagram, Identifying test cases,	
3.	4/9/2025	Error and fault taxonomies, Levels of testing,	
4.	8/9/2025	Examples: Generalized pseudo code, The triangle problem, The NextDate function,	
5.	9/9/2025	The Foodies-Wish- List Online Shopping Application,	
6.	11/9/2025	The Garage Door Controller, The currency converter, Saturn windshield wiper.	

7.	15/9/2025	Boundary Value Testing: Boundary value analysis, Robustness testing,	
8.	16/9/2025	Worst-case testing, Special value testing,	
9.	18/9/2025	Examples, Random Testing, Guidelines for Boundary value testing.	Assignment-1
10.	22/9/2025	Revision of unit1 concepts	
UNIT II			
11.	23/9/2025	The Equivalence Class Testing, Decision Table-Based Testing: Equivalence classes,	
12.	25/9/2025	Traditional equivalence class testing	
13.	29/9/2025	Improved Equivalence Class Testing,	
14.	30/9/2025	Equivalence test cases for the triangle problem, NextDate function,	
15.	6/10/2025	Equivalence Class Test Cases for the complete Order Method,	
16.	9/10/2025	Edge Testing, Guidelines and observations.	
17.	13/10/2025	Decision tables, Decision Table techniques,	
18.	14/10/2025	Test cases for the triangle problem NextDate function	
19.	16/10/2025	Cause and Effect Graph, Guidelines and observations.	Assignment-2
UNIT III			
20.	21/10/2025	Code based testing Program Graphs,	
21.	23/10/2025	DD paths, Code coverage metrics, E. F. Miller's Coverage Metrics,	
22.	27/10/2025	Basis path testing, guidelines and observations.	
23.	28/10/2025	Testing Object-Oriented Software: Unit Testing Frameworks,	
24.	30/10/2025	Mock Objects and Automated Object Mocking, Data Flow Testing,	
25.	3/11/2025	Definition-Use testing, Define/Use Testing,	
26.	4/11/2025	Examples, Object-Oriented Complexity Metrics,	
27.	6/11/2025	Issues in Testing Object-Oriented Software, Slice-Based Testing,	
28.	10/11/2025	Revision of unit3 concepts	
UNIT IV			
29.	11/11/2025	Beyond Unit Testing: Life Cycle-Based Testing, Traditional Waterfall Testing,	
30.	13/11/2025	Testing in Iterative Lifecycles,	
31.	17/11/2025	Agile Testing,	
32.	18/11/2025	Software Testing Integration Level: Software Testing Fundamentals,	
33.	20/11/2025	Integration Testing,	

34.	18/11/2025	Artificial Intelligence and Regression Testing,	
35.	20/11/2025	Integration Testing in the OO Context,	
36.	24/11/2025	Validation Testing, Testing patters.	
UNIT V			
37.	25/11/2025	Automation Testing Tools: Selenium–Open-source tool for automating web browsers,	
38.	27/11/2025	Katalon Studio Automation tool supporting web, API, mobile, and desktop apps.	
39.	1/12/2025	Appium – Open-source tool for mobile application testing.	
40.	2/12/2025	Apache JMeter – Open-source tool for performance and load testing.	
41.	4/12/2025	JUnit – Popular unit testing framework for Java.	
42.	8/12/2025	TestSigma - NLP-based test creation, self-healing tests, impact analysis	
43.	9/12/2025	Revision	
44.	11/12/2025	Discussion of last year SEE question paper	

Important Dates to be remembered:

Sl. No.	**Important Events**	**Date**
1.	I – Test	13/10/2025 - 18/10/2025 - 25/10/2025
2.	Last date for dropping of course	21/10/2025
3.	II – Test	15/11/2025 - 29/11/2025 - 06/12/2025
4.	Last date for withdrawal of course	1/12/2025
5.	Last working day	13/12/2025
6.	Preparation Holidays	14/12/2025 - 19/ 12/2025
7.	Semester end examination	20/12/2025 - 5/1/2026
8.	Announcement of results	17/1/2026

Activities to meet Teaching Learning Scheme:

Sl. No.	Activity Planned	Number of Hours
1.	Class Room Teaching	42
2.	Lab Related Activities	28
3.	Formative Assessment [Test (2 No.) +Quiz (2 No.) + Semester End Exam]	07
4.	Student Study Hours—Self Learning	14
5.	**Activity Based Learning:** **1. Activity: Completion of the MOOC course from Infosys Springboard** (17 Hours) 1. A course Titled "**Automate Software Testing with Python"** Level: Intermediate, Duration: 14 hours Course contents: i. Working with REST APIs and web applications, and technologies such as Unittest, ii. Postman and Selenium WebDriver. 2. Meeting and discussing the progress and doubt clearing session.2 Hours. 3. Evaluation and Presentation of knowledge gained and submitting the certificate - 1 Hour.	17 + 6 + 6 = 29

	2. Activity: Writing Assignment with Problems on Software Testing test case generation and concepts. (6 Hours) 1. Submission of the final assignment and evaluation. (Questions of Blooms level L3 and Higher) **3. Case Studies for Automation Testing Tools (6 Hours)** Evaluation: Submission of report and presentation of any case studies used in industries.	

Textbooks:

1.	Software Testing, A Craftsman's Approach, Paul C. Jorgensen and Byron DeVries, CRC Press, 5th Edition, 2021.
2.	Software Engineering - A Practitioners approach, Roger. S. Pressman, Bruce R. Maxim, Tata-McGraw Hill. 9th Edition, 2020, (Unit V)
3.	Web Links for Tools: 1. https://www.selenium.dev/documentation/ 2. https://katalon.com/katalon-studio 3. https://appium.io/docs/en/latest/ 4. https://jmeter.apache.org/usermanual/ 5. https://junit.org/junit5/docs/current/user-guide/ 6. https://testsigma.com/docs/

Reference Books:

1.	Software Testing techniques, Boris Beizer, Dreamtech publication 2018
2.	Foundations of Software Testing, Aditya P Mathur, Pearson Education, 2008.
3.	NPTEL Link: https://onlinecourses.nptel.ac.in/noc18_cs42/

Course Outcomes: Upon completion of this course, the student will be able to:

CO1	Illustrate the fundamental concepts, objectives, and importance of software testing in the software development lifecycle.
CO2	Distinguish between different levels and types of software testing and apply appropriate techniques for various testing scenarios.
CO3	Design, develop, and execute effective test cases and test plans based on software requirements.
CO4	Apply different testing methodologies used in industries for software testing.
CO5	Analyze and use manual and automated testing tools to efficiently perform functional and non-functional testing.

Mapping of Course Outcomes (COs) to Program Outcomes (POs) & Program Specific Outcomes (PSOs)

Course outcomes	**Pos**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	**2**		**3**	-	-	-	-	-	-	-	-	-	**2**	-	-
CO2		**2**		-	-	-	-	-	-	-	-	-	**3**	-	-
CO3			**3**		-	-	-	-	-	-	-	-	**2**	-	-
CO4			**2**		-	-	-	-	-	-	-	-	**3**	-	-
CO5		**2**			**3**				**2**	**2**			**2**		
CO (Average)	**2**	**2**	**3**	-	**3**	-	-	-	**2**	**2**	-	-	**3**	-	-

Degree of compliance **1**: Low **2**: Medium **3**: High

Course delivery methods, assessment tools and sample questions:

CO1	Illustrate the fundamental concepts, objectives, and importance of software testing in the software development lifecycle.
Delivery Methods	Chalk and talk
Assessment Tools	CIE- Test 1, SEE
Sample Questions	1. Discuss the differences between testing and debugging? (PO1,L2,4M) 2. How Functional testing is different from structural testing? How does the software organization handle each of these activities? (PO1,L1,6M)

CO2	Distinguish between different levels and types of software testing and apply appropriate techniques for various testing scenarios.
Delivery Methods	Chalk and Talk
Assessment Tools	CIE-Test 1, SEE
Sample Questions	1. Generate the test cases for the Triangle Problem using Boundary value analysis method (PO3,L1,8M) 2. Discuss the usage of equivalence class method to derive test cases with an example of nextDate problem. (PO2,L2,6M) 3. Explain the differences between black-box testing, white-box testing, and grey-box testing. (PO2,L2,6M)

CO3	Design, develop, and execute effective test cases and test plans based on software requirements.
Delivery Methods	Chalk and Talk
Assessment Tools	CIE: Test 2, SEE, Assignment
Sample Questions	1. Define a test case and a test plan**.** How do they differ? (PO2,L2,6M) 2. List the essential components of a test plan **as** suggested by IEEE/Pressman. (PO1,L2,6M) 3. Discuss the importance of prioritizing test cases during execution. 4. Distinguish between unit testing, integration testing, system testing, and acceptance testing with suitable examples. (PO2,L2,6M) 5. At which level of testing would you use stubs and drivers, and why? (PO2,L2,6M)

CO4	Apply different testing methodologies used in industries for software testing.
Delivery Methods	Chalk and Talk
Assessment Tools	CIE: Test 2, SEE, Assignment
Sample Questions	1. Explain the difference between manual testing and automation testing**.** (PO1,L1,6M) 2. Give one example of an industry where performance testing automation is critical. (PO2,L2,6M) 3. List the advantages and disadvantages of automation testing in software industries. (PO1,L1,6M)

	4. Give one example of an industry where performance testing automation is critical. (PO2,L2,6M)

CO5	Analyze and use manual and automated testing tools to efficiently perform functional and non-functional testing.
Delivery Methods	Chalk and Talk
Assessment Tools	CIE: Test 2, SEE, Assignment
Sample Questions	1. How can Selenium be used for automating functional test cases of a web application? (PO2,L2,6M) 2. Describe how JMeter or LoadRunner is used for performance testing. (PO2,L2,8M) 3. What role does Postman play in functional testing of APIs? (PO3,L4,6M) 4. Which testing tools are suitable for mobile application testing (manual and automated)? (PO2,L2,6M)

	Part A
Sl. No.	**Lab Programs /Topics Covered**
1	Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any 12 side is 10. Derive test cases for your program based on boundary-value analysis and execute the test cases and discuss the results. Test Data: Enter the 3 Integer Value (a, b and c) Pre-condition: $1 \leq a \leq 10$, $1 \leq b \leq 10$ and $1 \leq c \leq 10$ and $a < b + c$, $b < a + c$ and $c < a + b$
2	Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on equivalence class partitioning, execute the test cases and discuss the results. Test Data: Enter the 3 Integer Value (a, b and c) Pre-condition: $1 \leq a \leq 10$, $1 \leq b \leq 10$ and $1 \leq c \leq 10$ and $a < b + c$, $b < a + c$ and $c < a + b$
3	Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on decision tables-based testing, execute the test cases and discuss the results. Test Data: Enter the 3 Integer Value (a, b and c) Pre-condition: $1 \leq a \leq 10$, $1 \leq b \leq 10$ and $1 \leq c \leq 10$ and $a < b + c$, $b < a + c$ and $c < a + b$

4	Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of boundary-value analysis testing, derive different test cases, execute these test cases and discuss the test results. Test data: Enter the date with month/ day/ year format. Pre-condition: Month 1 to 12, Day 1 to 31 and Year 1812 to 2014
5	Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of Equivalence partition testing, derive different test cases, execute these test cases and discuss the test results. Test data: Enter the date with month/ day/ year format Pre-condition: Month 1 to 12, Day 1 to 31 and Year 1812 to 2014
6	Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of decision table-based testing, derive different test cases, execute these test cases and discuss the test results. Test data: Enter the date with month/ day/ year format Pre-condition: Month 1 to 12, Day 1 to 31 and Year 1812 to 2014
7	Design, develop, code and run the program in suitable language: Foodies-Wish-List is an online shopping service for extremely rare gourmet foods. It can be used either on a one-time basis as a guest, or repeatedly by members. There is no initial cost for either category, but to be a Foodies-Wish-List member, one must register with customary information, such as: • Member name, address, shipping address, telephone number, email address, preferred payment method, member credit card and PayPal Registered Foodies-Wish-List members receive discounts based on the price of an individual order as follows: a) orders less than $200 receive no discount. b) orders between $200 and $800 (inclusive) receive a 10% discount. c) orders over $800 receive a 15% discount. There is no discount for any guest order. Foodies-Wish-List members receive free shipping on any order over $200. For orders less than $200, there is a standard shipping price of $5.00. Analyze it from the perspective of boundary-value analysis testing, derive different test cases, execute these test cases and discuss the test results.
8	Design, develop, code and run the program in suitable language: Foodies-Wish-List is an online shopping service for extremely rare gourmet foods. It can be used either on a one-time basis as a guest, or repeatedly by members. There is no initial cost for either category, but to be a Foodies-Wish-List member, one must register with customary information, such as: • Member name, address, shipping address, telephone number, email address, preferred payment method, member credit card and PayPal Registered Foodies-Wish-List members receive discounts based on the price of an individual order as follows: a) orders less than $200 receive no discount. b) orders between $200 and $800 (inclusive) receive a 10% discount. c) orders over $800 receive a 15% discount. There is no discount for any guest order. Foodies-Wish-List members receive free shipping on any order over $200. For orders less than $200, there is a standard shipping price of $5.00. Analyze it from the perspective of Equivalence partition testing, derive different test cases,

9.	Design, develop, code and run the program in suitable language: Foodies-Wish-List is an online shopping service for extremely rare gourmet foods. It can be used either on a one-time basis as a guest, or repeatedly by members. There is no initial cost for either category, but to be a Foodies-Wish-List member, one must register with customary information, such as: • Member name, address, shipping address, telephone number, email address, preferred payment method, member credit card and PayPal Registered Foodies-Wish-List members receive discounts based on the price of an individual order as follows: a) orders less than $200 receive no discount. b) orders between $200 and $800 (inclusive) receive a 10% discount. c) orders over $800 receive a 15% discount. There is no discount for any guest order. Foodies-Wish-List members receive free shipping on any order over $200. For orders less than$200, there is a standard shipping price of $5.00. Analyze it from the perspective of decision table-based testing, derive different test cases, execute these test cases and discuss the test results.
	Part B
	Automation Testing
1.	Automate basic browser interactions and validate webpage behavior. - Selenium
2.	Automate web and mobile testing using a GUI-based tool.-- Katalon Studio – Cross-platform Automation.
3.	Automate a basic user interaction (login form) in a native Android application using Appium.
4.	Simulate load on web servers and analyze performance using Apache JMeter – Performance Testing tool.
5.	Write and run unit tests for Java applications using JUnit – Java Unit Testing Framework

Faculty

HoD 04/09/2025

Principal 4/9/2025