

Software Testing
(Theory)

Course Code	16CS72	Credits	03
Course type	PC	CIE Marks	50 Marks
Hours/week: L-T-P	3 – 0 – 0	SEE Marks	50 Marks
Total Hours:	40	SEE Duration	3 Hours

Course learning objectives

1. To introduce the terminology, testing, test-case, pseudo-codes / algorithms / flowcharts of Triangle, NextDate & Commission programs.
2. To develop the skill of analyzing the Triangle, NextDate & Commission programs, with the perspective of Boundary Value Analysis, Equivalence Class & Decision Table Testing paradigms.
3. To practice quality assurance related processes / methods / standards.

Pre-requisites:

- ❖ Software Engineering
- ❖ Graph Theory

Unit – I

8 Hours

A Perspective on Testing:

Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Levels of testing.

Examples: Generalized pseudocode, The triangle problem, The NextDate function, The commission problem.

Unit – II

8 Hours

The SATM (Simple Automatic Teller Machine) problem, The currency converter, Saturn windshield wiper.

Boundary value analysis Equivalence Class Testing, Decision Table-Based Testing:

Boundary value analysis, Robustness testing, Worst-case testing, Special value testing, Examples, Random testing, Guidelines for Boundary Value Testing.

Unit – III

8 Hours

Equivalence Class Testing:

Equivalence classes, Equivalence test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations.

Decision Table-Based Testing:

Decision tables, Test cases for the triangle problem. Decision tables for NextDate function, and the commission problem, Guidelines and observations.

Unit – IV

8 Hours

Path Testing, Data Flow Testing:

DD paths, Test coverage metrics, Basis path testing, guidelines and observations. Definition-Use testing. Slice-based testing, Guidelines and observations.

Unit – V

8 Hours

Data Flow Testing:

Define/Use Testing, Slice-Based Testing, Program Slicing Tools, Examples, Guidelines and observations.

Text Book:

1. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2008.

Reference Book:

1. Aditya P. Mathur: Foundations of Software Testing, Pearson Education, 2008.
2. Srinivasan Desikan, Gopalaswamy Ramesh: Software testing Principles and Practices, 2nd Edition, Pearson Education, 2007.

Course Outcome (COs):

At the end of the course, the student should be able to:

	Blooms Level
1. Define the test-case, testing, error taxonomy	L1
2. Illustrate test-cases for Triangle, NextDate & Commission programs, for boundary value analysis.	L2
3. Design test-cases for Triangle, NextDate & Commission programs, for equivalence class testing, decision table testing.	L3
4. Demonstrate the importance of verification & validation in improving the process of software development.	L3
5. Examine the testing, verification and validation for an application.	L4

Program Outcome of this course (POs)

PO No.

- | | |
|---|----------|
| 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. | 1 |
| 2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. | 2 |

3. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. 5
4. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. 9

Course delivery methods

1. Lecture & Board
2. Power-point Presentation
3. Online Videos / Learning
4. NPTEL / EDUSAT
5. Class Room Exercises

Assessment methods

1. Assignments
2. Quizzes
3. Internal Assessment Tests
4. Course Seminar
5. Course Project (Mini project)

Scheme of Continuous Internal Evaluation (CIE):

Components	Average of best two IA tests out of three	Average of assignments (Two) / activity	Quiz	Class participation	Total Marks
Maximum Marks: 50	25	10	5	10	50
➤ Writing two IA test is compulsory. ➤ Minimum marks required to qualify for SEE: 20					

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. It will be conducted for 100 marks of 3 hours duration. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. **Minimum marks required in SEE to pass: 40 (out of 100)**
3. Question paper contains 08 questions each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (any 2 units) and choice will be given in the remaining three units.