

A10.4-R4: SOFTWARE TESTING AND DEVELOPMENT TOOLS

Objective of the Course

This objective of the course is to make students aware about the importance of the software testing during software development. The course covered to be in line with the development tools and languages taught in this level. The course will prepare the student for software testing and debugging. It will further laid the foundation for advanced courses in Software quality assurances.

Outline of Course

S. No.	Topic	Minimum number of hours
1.	Introduction	02
2.	Importance of Software testing	04
3.	Testing Techniques and Strategy	10
4.	Verification and Validation	06
5.	Building Test Cases and Plans	20
6.	Quality Assurance and Standards	10
7.	Debugging Technique and tools	04
8.	External source of errors	04
	Lectures	= 60
	Practical/tutorials	= 60
	Total	= 120

Detailed Syllabus

- 1. Introduction** **02 Hrs.**
Software program and its objective, Software development techniques, top-down verses bottom-up approach, modular and structures programming. A brief introduction about object oriented approach.
- 2. Importance of Software Testing** **04 Hrs.**
Software testing and its importance, software development life cycle verses software testing life cycle, Deliverables, version and error control
- 3. Testing techniques and Strategy** **10 Hrs.**
Unit testing, Integration testing, System testing, Acceptance testing
White-Box testing: Flow Graph notation, Cyclomatic Complexity, Graph matrices, control structure and loop testing.
Black-Box testing: Equivalence partitioning, Boundary Value Analysis, Orthogonal Array testing.
- 4. Verification and Validation** **06 Hrs.**
Requirement verification, Coding standards, Walk through, Formal Inspection, Design validation and verification, Function test, Design metrics, correctness proof and its requirement.

5. Building Test Cases and Plans**20 Hrs.**

Format of test cases, Du, dc and other data paths, Test data selection, branch coverage, statement coverage, pre-condition and post-condition, Test schedule and check pointing, suitable exercises for creating test cases for each type of techniques mentioned in para 3.

6. Quality assurance and Standards**10 Hrs.**

Basic software quality parameters and its metrics, Software Configuration Change and types of errors, Quality management models: ISO, SPICE, IEEE, CMM

7. Debugging techniques and tools**04 Hrs.**

Integrated development environment, debugging, tracing, data inspection, exception errors, code and data redundancy, unreachable code.

8. . External Source of errors**04 Hrs.**

Main memory, conflicting dll and unknown interface as source of error and their rectification.

RECOMMENDED BOOKS

MAIN READING

1. W. M. Perry, "Effective Methods for Software Testing", 2002, Wiley.
2. R. Pressmam, "Software Engineering", 6th Edition, 2002, McGraw-Hill.

SUPPLEMENTARY READING

1. Boris Beizer, "Testing Techniques", II Edition, 1996, Van Nostrand Reinhold Co.
2. Rajani & Oak, "Software Testing : Methodology, Tools and Processes" TMH (2004)