IV Year – I SEMESTER

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Elective - I
Software Testing Methodologies

Course Objectives:

To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
To understand software test automation problems and solutions.
To learn how to write software testing documents, and communicate with engineers in various forms.
To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Course Outcomes:

By the end of the course, the student should:

Have an ability to apply software testing knowledge and engineering methods.
Have an ability to design and conduct a software test process for a software testing project.
Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems
Have an ability to use software testing methods and modern software testing tools for their testing projects.

Syllabus:

UNIT I:

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to developmentlife cycle Software Testing Methodology.

UNIT II:
Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation
Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing

UNIT III:
Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing
Static Testing: inspections, Structured Walkthroughs, Technical reviews

UNIT IV:
Validation activities: Unit testing, Integration Testing,. Function testing, system testing, acceptance testing
Regression testing: Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques

UNIT V:
Efficient Test Suite Management: Test case deisgnWhy does a test suite grow, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite
Software Quality Management: Software Quality metrics, SQA models
Debugging: process, techniques, correcting bugs, Basics of testing management tools, test link and Jira

UNIT VI:
Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools.
Testing Object Oriented Software: basics, Object oriented testing
Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

Text Books:

Software Testing, Principles and Practices, Naresh Chauhan, Oxford
Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
Software Testing- Yogesh Singh, CAMBRIDGE

Reference books:

Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
Software Testing, Principles, techniques and Tools, M G Limaye, TMH
Effective Methods for Software testing, Willian E Perry, 3ed, Wiley