



# COMSATS University Islamabad

## Department of Computer Science

### Syllabus Fall/Spring\_\_\_\_\_

#### I. Course code and Title

<b>CSE455</b>	<b>SOFTWARE TESTING</b>
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#### II. Course Prerequisites

Course Code	Title
CSE302	Software Quality Engineering

#### III. Instructor's Information

<b>Full Name:</b>	
<b>Email:</b>	
<b>Contact Number</b>	
<b>Office Hours &amp; Location</b>	
<b>Teaching Assistant (if any)</b>	

#### IV. Course Composition

	Credit Hours	Weekly	Duration (hrs)	Contact Hours
<b>Lectures</b>	2	2	1.0	2.0
<b>Laboratories</b>	1	1	3.0	3.0

#### V. Course Description

Software Testing Process; Why Software Testing? Levels of Software Testing; Types of Software Testing; Relationship between SDLC and Software Testing; Software Testing Techniques; Software Test Case Design Techniques; Test Case Modeling Techniques; Defects Vs. Failures; Equivalence Classes; Boundary Testing; Types of Defects; Black-Box Vs. Structural Testing; Testing Strategies; Unit Testing; Integration Testing; Profiling; Test Driven Development; State Based Testing; Configuration Testing; Compatibility Testing; Web Site Testing; Coverage and Usage Testing Based on Checklists and Partitions; Coverage and Usage Testing Based on FSM; FSM Based Testing; Control Flow; Data Dependency and Interaction Testing; Good and Bad Test Cases; Alpha, Beta and Acceptance Testing; Test Instrumentation and Tools; Developing Test Plans; Managing the Testing Process; Test Case Results Analysis, Reporting Software Testing Process
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#### VI. Text book

1. Software Testing Foundations, Spillner A., Linz, T., Schaefer H., 4th Edition (2014), Rocky Nook.
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## VII. Reference books & Material

1. Advanced Software Testing, Black, R., Rocky Nook, 2014.
2. Foundations of Software Testing, Mathur, A., Addison-Wesley Professional, 2014.
3. Foundations of Software Testing, Kaner, C., Fiedler, R., Context-Driven Press, 2013.

## VIII. Course Assessment

Evaluation methods	Theory Weight (%) [T]	Lab Weight (%) [L]
Quizzes	15	15
Assignments	10	10
Sessional Exam (I and II)	10+15	10+15
Terminal Exam	50	50
Total	100	100
<b>Total = T+L</b>	<b>T=(T/100)*67</b>	<b>L=(L/100)*33</b>

The course teacher may select any one of the above weightage as per the course credit hours.

## IX. Course Outline and Contents

Lecture	CDF Unit #	Topics Covered	Textbook Section
1.	1	Introduction to the class and course.	Chapter-1
2.	1	Fundamental of Software Testing, Error, Defect, and Bug Terminology, Testing Terms, Software Quality Test Effort	Chapter-2
3.	1	The Fundamental Test Process, Test Planning and Control, Test Analysis and Design, Test Implementation and Execution, Test Evaluation and Reporting, Test Closure Activities, The Psychology of Testing, General Principles of Testing, Ethical Guidelines	Chapter-2
4.	2	Testing in the Software Life Cycle, The General V-Model, Component Testing, Integration testing, System testing.	Chapter-3
5.	2	Acceptance Testing Contract Acceptance Testing, Testing for User Acceptance, Operational (Acceptance) Testing, Field Testing, Testing New Product Versions, Software Maintenance, Testing after Further Development, Testing in Incremental Development.	Chapter-3
6	2	Generic Types of Testing, Functional Testing, Nonfunctional, Testing of Software Structure, Testing Related to Changes and Regression Testing.	Chapter-3
7	3	Static Test Structured Group Evaluations, Foundations, The General Process, Roles and Types of Reviews	Chapter-4
8	4	Static Analysis, The Compiler as a Static Analysis Tool, Examination of Compliance to Conventions and Standards	Chapter-4
9	4	Execution of Data Flow Analysis, Execution of Control Flow Analysis, Determining Metrics	Chapter-4
10		<b>Sessional-1</b>	
11		Paper solution discussion, Results feedback and paper review	

12	5	Black Box Testing ,Equivalence Class Partitioning,, Boundary Value Analysis,	Chapter-5
13	5	State Transition Testing, Logic-Based Techniques	Chapter-5
14	5	(Cause-Effect Graphing, and Decision Table Technique, Pairwise Testing),	Chapter-5
15	5	Use-Case-Based Testing ,General Discussion of the Black Box Technique	Chapter-5
16	6	White Box Testing Techniques, Statement Testing and Coverage.	Chapter-5
17.	6	Decision/Branch Testing and Coverage, Test of Conditions	Chapter-5
18.	6	General Discussion of the White Box, Instrumentation and Tool Support	Chapter-5
19	6	Intuitive and Experience-Based Test Case Determination, Experience-based techniques, Attacks	Chapter-5
20	6	Defect taxonomies ,Error guessing and ad hoc testing , Exploratory testing	Chapter-5
21		<b>Sessional-2</b>	
22		Paper solution discussion, Results feedback and paper review	
23	7	Test Plan Document with IEEE Standard 829-1998 Guidelines	IEEE Standard Guidelines
24	7	Explain Test Plan Document with example	IEEE Standard Guidelines
25	8	Test Management, Test Teams, Tasks and Qualifications, Planning, Quality Assurance Plan, Test Plan, Prioritizing Tests, Test Entry and Exit Criteria.	Chapter-6
26	8	Cost and Economy Aspects, Costs of Defects Cost of Testing, Test Effort Estimation	Chapter-6
27	8	Choosing the Test Strategy and Test Approach, Preventative vs. Reactive Approach, Analytical vs. Heuristic Approach, Testing and Risk	Chapter-6
28	8	Managing The Test Work, Test Cycle Planning, Test Cycle Monitoring, Test Cycle Control	Chapter-6
29	8	Incident Management, Test Log, Incident Reporting, Defect Classification, Incident Status. Requirements to Configuration, Relevant Standards	Chapter-6
30	9	Test Tools, Types of Test Tools, Tools for Management and Control of Testing and Tests	Chapter-7
31	9	Tools for Test Specification , Tools for Static Testing, Tools for Dynamic Testing , Tools for Non-functional Test.	Chapter-7
32	9	Selection and Introduction of Test Tools, Cost Effectiveness of Tool Introduction, Tool Selection, Tool Introduction	Chapter-7
		<b>Terminal Examination</b>	

## **X. Course Learning Outcomes(CLO)and Program Learning Outcomes**

Upon completion of the course, students will be able to:

<b>CLO</b>	<b>Description</b>	<b>PLO</b>
<b>C1</b>	Explain software testing processes and its levels.	a-1
<b>C2</b>	Apply tests cases on medium size system.	c-5
<b>C3</b>	Develop a software test plan for a medium size software system using standard method.	j-3
<b>C4</b>	Demonstrate the use of modern software testing tools.	i-2

## **Program Learning Outcomes (PLOs)**

<b>PLO</b>	<b>Description</b>
<b>a-1</b>	Use knowledge of computing to solve problems.
<b>c-5</b>	Apply and maintain a computer-based system, process, component, or program.
<b>j-3</b>	Use of software engineering theory in the modeling and design of computer-based systems.
<b>i-2</b>	Ability to use modern tools necessary for engineering practice computing practice.

## **XI. Assessment Schedule - Tentative**

Give your tentative assessment plan with submission due date.

<b>S. No.</b>	<b>Artifact</b>	<b>Due Date</b>	<b>Remarks</b>
1	Assignment 1		
2	Sessional 1		
3	Assignment 2		
4	Assignment 3		
5	Sessional 2		
6	Assignment 4		
7	Terminal Examination		

The course teacher may add quizzes, project or more assignment as he/she may deemed fit

## XII. Policy & Procedures

- **Attendance Policy:** Every student must attend 80% of the lectures delivered in this course and 80% of the practical/laboratory work prescribed for the respective courses. The students falling short of required percentage of attendance of lectures/seminars/practical/laboratory work, etc., shall not be allowed to appear in the terminal examination of this course and shall be treated as having failed this course.
- **Grading Policy:** The minimum pass marks for each course shall be 50%. Students obtaining less than 50% marks in any course shall be deemed to have failed in that course. The correspondence between letter grades, credit points, and percentage marks at CUI shall be as follows:

Grade	A	A-	B+	B	B-	C+	C	C-	D	F
Marks	90 - 100	85 - 89	80 - 84	75 - 79	70 - 74	65 - 69	60 - 64	55 - 59	50 - 54	<50
Cr. Point	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.7	1.3	0.0

- **Missing Exam:** No makeup exam will be given for final exam under any circumstance. When a student misses Sessional 1 or Sessional 2 for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the Department policy. Further, the student must provide an official excuse within one week of the missed exam.
- **Academic Integrity:** All CUI policies regarding ethics apply to this course. The students are advised to discuss their grievances/problems with their counsellors or course instructor in a respectful manner.
- **Plagiarism Policy:** Plagiarism, copying and other anti-intellectual behavior are prohibited by the university regulations. Violators may have to face serious consequences.