

Subject Description Form

Subject Code	COMP441
Subject Title	Software Testing and Quality Assurance
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: COMP302 (Nil for 61025) Co-requisite/Exclusion: Nil
Objectives	<ul style="list-style-type: none">• To present the concepts, techniques and metrics for quality assurance in software development.• To develop a good understanding of issues, techniques and tools for software testing.• To enable students to gain a working knowledge of techniques for management of testing projects.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><i>Professional/academic knowledge and skills</i></p> <p>(a) appreciate the importance of software quality assurance;</p> <p>(b) apply software testing techniques for information systems development;</p> <p>(c) know the inputs and deliverables of the testing process;</p> <p><i>Attributes for all-roundedness</i></p> <p>(d) work together as a team in preparing a report;</p> <p>(e) communicate in writing a technical document;</p> <p>(f) communicate effectively in English for general project presentation.</p> <p>Alignment of Programme Outcomes:</p> <p>Programme Outcome 1: This subject contributes to having students practice their writing skills with project document and report writing.</p> <p>Programme Outcome 4: This subject contributes to developing student critical thinking through tutorial and lab exercises on solving problems. They will also practice more in written assignments, programming exercises, and project.</p> <p>Programme Outcome 7: This subject contributes to team work with group-based project for students to practice team spirit.</p>

Subject Synopsis/ Indicative Syllabus	Topic																																																										
	1. Software quality assurance Quality factors; cost of quality.																																																										
	2. Testing fundamentals Understanding defects; testing concepts; levels of testing; test process																																																										
	3. Code-based techniques Control flow and data flow testing; mutation testing; domain testing; error-oriented testing.																																																										
	4. Specification-based techniques Equivalence partitioning; boundary value testing; state machine testing; program verification.																																																										
	5. Inspection technique Team and roles; process.																																																										
	6. Test tools Test generation; code coverage tool; defect tracking.																																																										
7. Measuring software quality Product metrics; process metrics; GQM; testing maturity model.																																																											
Teaching/Learning Methodology	The software testing techniques and quality assurance concepts will be covered in the lectures. In the tutorials, students will work on exercises and case studies on software testing techniques. The tutorial will also cover common software testing tools (e.g. unit testing, coverage measurement, GUI testing, performance testing).																																																										
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="483 1213 743 1318" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="743 1213 922 1318" rowspan="2">% weighting</th> <th colspan="6" data-bbox="922 1213 1393 1318">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="922 1318 1027 1371">a</th> <th data-bbox="1027 1318 1133 1371">b</th> <th data-bbox="1133 1318 1239 1371">c</th> <th data-bbox="1239 1318 1344 1371">d</th> <th data-bbox="1344 1318 1450 1371">e</th> <th data-bbox="1450 1318 1555 1371">f</th> </tr> </thead> <tbody> <tr> <td data-bbox="483 1371 743 1455">1. Assignments</td> <td data-bbox="743 1371 922 1455" rowspan="3" style="text-align: center; vertical-align: middle;">55%</td> <td data-bbox="922 1371 1027 1455" style="text-align: center;">✓</td> <td data-bbox="1027 1371 1133 1455" style="text-align: center;">✓</td> <td data-bbox="1133 1371 1239 1455" style="text-align: center;">✓</td> <td data-bbox="1239 1371 1344 1455"></td> <td data-bbox="1344 1371 1450 1455"></td> <td data-bbox="1450 1371 1555 1455"></td> </tr> <tr> <td data-bbox="483 1455 743 1539">2. Project</td> <td data-bbox="922 1455 1027 1539"></td> <td data-bbox="1027 1455 1133 1539" style="text-align: center;">✓</td> <td data-bbox="1133 1455 1239 1539"></td> <td data-bbox="1239 1455 1344 1539" style="text-align: center;">✓</td> <td data-bbox="1344 1455 1450 1539" style="text-align: center;">✓</td> <td data-bbox="1450 1455 1555 1539" style="text-align: center;">✓</td> </tr> <tr> <td data-bbox="483 1539 743 1623">3. Mid-term</td> <td data-bbox="922 1539 1027 1623" style="text-align: center;">✓</td> <td data-bbox="1027 1539 1133 1623" style="text-align: center;">✓</td> <td data-bbox="1133 1539 1239 1623" style="text-align: center;">✓</td> <td data-bbox="1239 1539 1344 1623"></td> <td data-bbox="1344 1539 1450 1623"></td> <td data-bbox="1450 1539 1555 1623"></td> </tr> <tr> <td data-bbox="483 1623 743 1707">4. Examination</td> <td data-bbox="743 1623 922 1707" style="text-align: center;">45%</td> <td data-bbox="922 1623 1027 1707" style="text-align: center;">✓</td> <td data-bbox="1027 1623 1133 1707" style="text-align: center;">✓</td> <td data-bbox="1133 1623 1239 1707" style="text-align: center;">✓</td> <td data-bbox="1239 1623 1344 1707"></td> <td data-bbox="1344 1623 1450 1707"></td> <td data-bbox="1450 1623 1555 1707"></td> </tr> <tr> <td data-bbox="483 1707 743 1791">Total</td> <td data-bbox="743 1707 922 1791" style="text-align: center;">100 %</td> <td colspan="6" data-bbox="922 1707 1393 1791"></td> </tr> </tbody> </table>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	f	1. Assignments	55%	✓	✓	✓				2. Project		✓		✓	✓	✓	3. Mid-term	✓	✓	✓				4. Examination	45%	✓	✓	✓				Total	100 %						
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:																																																											
Students are required to work as a team on a project related to software testing and																																																											

	<p>software quality assurance. This can be used to assess the students on their (b) understanding in software testing techniques for information systems development. Also, the students will be assessed on their ability to (d) work together as a team in preparing a report, (e) writing technical documents, and (f) communicate effectively in English for general project presentation.</p> <p>Assignment(s), mid-term(s) and the final examination will be used to assess the students on their academic knowledge and skills in software testing, which include the ability to (a) appreciate the importance of software quality assurance, (b) apply software testing techniques for information systems development and (c) knowledge in the inputs and deliverables of the testing process.</p>	
Student Study Effort Expected	Class contact:	
	<ul style="list-style-type: none"> ▪ Lecture 	39 Hrs.
	<ul style="list-style-type: none"> ▪ Tutorial 	0 Hrs.
	Other student study effort:	
	<ul style="list-style-type: none"> ▪ 	Hrs.
	<ul style="list-style-type: none"> ▪ 	Hrs.
	Total student study effort	At least 39 Hrs.
Reading List and References	<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Ron Patton, Software Testing (2nd Edition), Sams Publishing , 2005 2. Hung Q. Nguyen, Bob Johnson, Michael Hackett and Robert Johnson , Testing Applications on the Web: Test Planning for Mobile and Internet-Based Systems (Second Edition), John Wiley, 2003 3. Rick D. Craig and Stefan P. Jaskiel, Systematic Software Testing, Artech House Publishers, 2002 4. Nina S. Godbole , Software Quality Assurance: Principles And Practice, Alpha Science International, Ltd, 2004 	