SEG3103 SOFTWARE QUALITY ASSURANCE

(3 hrs lecture, 1.5 hrs lab, 1.5hrs tut, 3 cr).

Quality: how to assure it and verify it, and the need for a culture of quality. Avoidance of errors and other quality problems. Inspections and reviews. Testing, verification and validation techniques. Process assurance vs. Product assurance. Quality process standards. Product and process assurance. Problem analysis and reporting.

Prerequisite: SEG2105

Schedule

Day	*Time*	*Room*	*Activity*
Thursday	8:30AM – 11:30AM	SMD 425	Lecture
Friday	2:30PM – 4:00PM	SMD 425	Tutorial
Friday	4:00PM – 5:30PM	STE2052/2060	Lab

Instructor

Stéphane S. Somé , Office: STE 5033
Ph: 562-5800 ext 6714 , Email: `ssome@eecs.uottawa.ca`
Office Hour: Tuesday 1:00PM – 2:00PM

Teaching Assistants

Books

- References (sample)
    - Jeff Tian, Software Quality Engineering Testing, Quality Assurance, and Quantifiable Improvement, IEEE Computer Society, 2005
    - Daniel Galin, Software Quality Assurance From theory to implementation, Pearson 2004
    - P. Tahchiev, F. Leme, V. Massol, G. Gregory, JUnit in Action (2011)
    - P. Ammann, J. Offut, Introduction to Software Testing, Cambridge, 2008
    - K. Naik, P. Tripathy, Software Testing and Quality Assurance Theory and Practice, Wiley, 2008
    - S. Desikan, G. Ramesh, Software Testing Principles and Practices, Pearson, 2006
    - M. Utting, B. Legeard, Practical Model-Based Testing A Tools Approach, 2007
    - T. Glib, D. Graham, Software Inspection, Addison-Wesley, 1993.
    - R.V. Binder, Testing Object-Oriented Systems, Addison-Wesley, 1999.
    - S.J. Prowell et al, Cleanroom Software Engineering Technology and Process, Addison-Wesley, 1998.

Course objectives

The objectives of this course is to introduce to approaches for the development of high quality software systems. After completing this course, students will:

- be knowledgeable to a variety of functional (black-box), structural (white box) and model-based (gray-box) testing techniques
- be aware of statistical approach for software reliability engineering
- be familiar with principles of software validation through reviews and inspections
- be aware of process management issues in Software Quality Engineering such as software quality metrics and certification standards.

Content

1. Introduction to software quality assurance
2. Introduction to software testing (challenges, test planning)
3. Black-Box testing techniques
4. White Box (Structural) Testing
5. Grey-Box Testing
6. System Integration
7. System testing
8. Test planning and management
9. Software reviews and inspections
10. Static analysis
11. Software quality metrics and assessment

Marking Scheme

Assignments : 40% (or less)

- labs and tutorials : 10%
- assignments : 30%

Midterm : 20% - tentatively **June 8th**
Final Exam: 40%

The marks for the assignments will not be taken into account if the average of your exams (mid-term and final) marks is below 50%. Given **A** your assignments mark out of 40, **M** your midterm mark out of 20 and **F** your final exam mark out of 40,

- if **M+F** < 30 your **total mark** out of 100 will be equal to (**M+F**)*100/60
- otherwise, your **total mark** out of 100 will be **A+M+F**

Notice that all components of the course (i.e assignments, lab/tutorial reports, exams, ...) must be fulfilled otherwise you may receive an EIN as a final mark (equivalent to an F).

You must read and abide by the regulations on academic fraud (**see http://www.uottawa.ca/academic-regulations/academic-fraud.html**).

Missed Midterm : students who miss the midterm exam due to a illness must provide a medical certificate to the instructor. The weight of the midterm will then be applied to final examination.

Missed Lab/Tutorial : students who miss a lab or tutorial due to a illness must provide a medical certificate to the instructor. The student must arrange a deadline for the submission of the missed lab/tutorial report with the instructor.

Late Policy: all work must be handed online on Virtual Campus by the deadline specified. Any late submission will result in mark zero (0) unless a justification is provided and accepted by the instructor and/or a special extension was granted before the original deadline. Note that the submission time as recorded by Virtual Campus is the only one considered.

Attendance

Class attendance is mandatory. As per academic regulations (see page 10 of faculty regulations), students who do not attend 80% of the class may not be allowed to write the final examination.

Prevention of sexual violence

The University of Ottawa does not tolerate any form of sexual violence. Sexual violence refers to any act of a sexual nature committed without consent, such as rape, sexual harassment or online harassment. The University, as well as student and employee associations, offers a full range of resources and services allowing members of our community to receive information and confidential assistance and providing for a procedure to report an incident or make a complaint. For more information, visit www.uOttawa.ca/sexual-violence-support-and-prevention.

Calendar

Note that this is tentative and may be subject to adjustments.

Week	*Lectures*	*Tutorials*	*Labs*	*Assignments*
1: May 1st	Presentation Introduction to SQA		Unit testing frameworks	
2: May 7th	Testing fundamentals Black box testing - 1	Equivalence Classes Category Partition	Test implementation	
3: May 14th	Black box testing - 2	Cause Effect Graphs Decision Tables	Test implementation	
4: May 21st	White box testing -1	Control Flow test design	Code coverage	
5: May 28th	White box testing - 2 Grey box testing	Data Flow test design State-based test design	State-based test implementation	Assignment #1 due
6: June 4th	Integration Testing	**Midterm Exam**	Mock frameworks	
7: June 11th	System Testing (Acceptance, Functional)	Functional/Accepance tests design	Functional/Acceptance tests implementation	
8: June 18th	System Testing (Security)		Security testing	Assignment #2 due
9: June 25th	System Testing (Performance & Misc)		Performance testing	Hand assignment #3
10: July 2nd	Test Planning and Management Static Analysis		Mutation Testing Static analysis	
11: July 9th	Software Quality Metrics and Process Improvement			Assignment #3 due
12: July 16th	Review			