UVic Department of Electrical and Computer Engineering

COURSE OUTLINE
SENG 426 – Software Quality Engineering
Summer 2014

Instructor:

    Dr. Issa Traore
    Phone: 250-721-8697
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Office Hours:

    Days: Monday, Thursday
    Time: 2:30-4:00pm
    Location: EOW 415

Lectures:

    A-Section(s): A01 / CRN 30722
                   A02 / CRN 30723
    Days: Monday, Thursday
    Time: 13:00-14:20am
    Location: CLE A206

Labs: **No lab**   **Location:**

    B-Section(s): B01 / CRN 30724
                   B02 / CRN 30725
    Days: Monday
    Time: 2:30-5:20pm
    Location: ELW B220

Required Text:

    Title: Software Testing and
          Quality Assurance
    Author: Kshirasagar Naik and
          Priyadarshi Tripathy
    Publisher: Wiley
    Year: 2008

Optional Text:

    Title:

    Author:

    Publisher:
    Year:

References:

1. Software Quality Engineering, Jeff Tian, Wiley, 2005
2. Peer Review in Software- A Practical Guide", Karl E. Wiegers, Addison Wesley, ISBN: 0-201-73485-0
3. "Testing Computer Software", C. Kaer, J. Falk, H. Q. Nguyen, 2nd Edition, Wiley, 1999, ISBN: 0-471-35846-0
4. "Software Reliability Engineering: More Reliable Software Faster and Cheaper", John D. Musa, 2nd Edition, McGraw-Hill 1998, ISBN: 0-70-913271-5
5. "Managing Software Quality and Business Risk", Martyn Ould, Wiley 1999, ISBN: 0-471-99782-X
6. Lectures Notes/Slides: on Moodle

Assessment:

    Attendance/Class participation: 4%
    Project: 36% (Part I: 6%; Part II: 8%; Part III: 12%; Part IV: 10%)
    Mid-term Exam: 20%   Date: June 26/2014
    Final: 40%

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

Due dates for assignments:
1. Project Part 1: due May 26, 2014
2. Project Part 2: due June 16, 2014
3. Project Part 3: due July 7, 2014
4. Project Part 4: due July 28, 2014

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

Passing Grades	Grade Point Value	Percentage for Instructor Use Only	
A+	9	90 – 100	
A	8	85 – 89	
A-	7	80 – 84	
B+	6	77 – 79	
B	5	73 – 76	
B-	4	70 – 72	
C+	3	65 – 69	
C	2	60 – 64	
D	1	50 – 59	
Failing Grades	**Grade Point Value**	**Percentage for Instructor Use Only**	**Description**
E	0	35 - 49	Fail, conditional supplemental exam. (For undergraduate courses only)
F	0	0 – 49	Fail, no supplemental.
N	0	0 – 49	Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.

The rules for supplemental examinations are found on page 80 of the current 2013/14 Undergraduate Calendar.

Term in which E Grade Was Obtained	Application Deadline for Supplemental Exam	Supplemental Exam Date
First term of Winter Session (Sept – Dec)	February 28 in the following term	First week of following May
Second term of Winter Session (Jan – Apr)	June 30 in the following term	First week of following September
Summer Session (May – Aug)	October 31 in the following term	First week of following January

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

Course Description

Course Objectives

The purpose of the course is to introduce fundamental notions of software quality and the techniques used to build and check quality in software systems. A particular emphasis is placed on quantitative assessment of software quality and quality control using software testing techniques.

Learning Outcomes

By the end of this course, students should have a good grasp of software quality metrics and models, software testing techniques, and software reliability analysis models and techniques.

Syllabus

The following syllabus is subject to the time available and may change during the term. Some of the topics may not be covered.

Unit 1. Software Quality: Overview and Basics

Introduce software quality standards and processes, quality planning and control, quality attributes and specification. Specifically, the following issues will be covered:

- Quality Assurance and Standards
- Quality Specification
- Quality Control

Unit 2. Software Inspection

Overview of different types of software review and focus on quality review through (formal) inspection. Introduce inspection process, documents and metrics.

Unit 3. Quality Models and Measurements

Presentation of quality management models; Use of quality models and data for in-process quality management and to guide software testing. Introduction of a number of techniques to quantify, classify and analyze discovered defects.

Unit 4. Software Reliability Models

Notions of software reliability and reliability growth. Overview of software reliability growth models (SGRM).

Unit 5. Testing: Concepts and Management

Presentation of testing dimensions, concepts, terminologies and processes. Introduction to lifecycle testing and to model-based testing. Discussion of underlying issues and approaches to test management. Introduction to test planning, test status and defect reporting.

Unit 6. Domain Testing

Presentation of selected test models and testing strategies: domain test model.

Unit 7. Test generation from Finite-State Machines

Presentation of selected test models and testing strategies: state-based test model.

Unit 8. Control Flow and Data Flow Testing

Notion of test adequacy; test coverage criteria and metrics; the basis-path test model; control flow testing.

Unit 9. Combinational Testing

Presentation of selected test models and testing strategies: combinational test model.

Unit 10. System Integration Testing

Presentation of selected test models and testing strategies: test integration.

Unit 11. Software Reliability Engineering

Notions of software reliability and availability; comparison between hardware and software reliability; Software Reliability modeling and metrics. Reliability block diagrams; concurrent systems (series/parallel) reliability. Application of reliability concepts and models within a disciplined and systematic software engineering process. Reliability validation and demonstration.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the ECE Chair by email or the ECE Chair's secretary to set up an appointment.

Accommodation of Religious Observance
See http://web.uvic.ca/calendar2013/GI/GUPo.html

Policy on Inclusivity and Diversity
See http://web.uvic.ca/calendar2013/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour
at http://www.uvic.ca/engineering/current/undergrad/index.php#section0-25
which contains important information regarding conduct in courses, labs, and in the general use of
facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the
University and the Department. You should consult

http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic
integrity.

**Plagiarism detection software may be used to aid the instructor and/or TA's in the review and
grading of some or all of the work you submit.**