University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

Course Title SENG 426 – Software Quality Engineering

Term – SUMMER 2015 (201505)

Instructors

Dr. Imen Bourguiba
Phone:
E-mail: imenbour@uvic.ca

Dr. Haytham El Miligi
Phone:
E-mail: Haytham@ece.uvic.ca

Office Hours

Days: Wednesday
Time: 9:30 - 10:30 a.m.
Location: EOW 419

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 the following:
-Software quality metrics and models
-Software testing techniques
-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

A-Section(s): A01 / CRN 30732 B01 W 15:30-17:20 TA (usama@uvic.ca)
A02 / CRN 30733 F 14-15:50
Days: TWF Location: ELW B220
Time: 8:30-9:20
Location: ECS 130

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:

Assessment:

Attendance/Class Participation:	5%	
Labs	35%	Due Dates: (Part 1: 5%; Part 2: 8%; Part 3: 12%; Part 4: 10%)
Mid-term	20%	Date: June 12, 2015
Final Exam	40%	

Note: (sample notes for the instructors)
Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
Failure to pass the final exam will result in a failing grade for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

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 Chair of the Department by email or the Chair's Secretary to set up an appointment.

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

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

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, 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 entry in current Undergraduate Calendar for the UVic policy on academic integrity.

http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.