Software Testing - SFWRENG 3S03

Term 2, 2021-22

Course Information

Instructor: Prof. Richard Paige
Office: ITB 159A (allegedly)
Office Hours: by appointment
Email: paigeri@mcmaster.ca

Teaching Assistants: tba

Course website: on Avenue to Learn

Lectures: (starting week of 10 January) Mondays and Wednesdays 1130-1220, Fridays 130-220pm. Lectures will be online (on Teams) from 10 January until (allegedly) we start in-person on 7 February 2022 – but this may change.

Notes: midterm recess 21-25 February (no classes)

Tutorials: (starting week of 17 January) Wednesdays 230-420pm (two sections), Fridays 1030-1220, every other week.

Midterm: Monday 28 February, 50 minutes during class time (at the moment I don't know if this will be an online Avenue quiz, or an in-person test, or something else)

Course Outline: Measurement, unit testing, slicing and debugging, inspection, integration testing, regression testing, testing strategies, static analysis, software metrics, software project management and its relationship to testing, testing in practice.

Textbooks:

(Neither are required, both are useful, both are expensive, we will not teach directly from either book)

- Paul Ammann and Jeff Offutt, *Introduction to Software Testing,* Second Edition.
- Cem Kaner et al, *Lessons Learned in Software Testing: A Context Driven Approach*

Lecture notes: made available on the course website hopefully just before each lecture.

Prerequisite knowledge and experience:

Basic knowledge of discrete math, data structures and algorithms. Familiar with fundamental ideas of software development. Comfortable in at least one programming language (examples will mostly make use of Java, but there'll also be some C from time to time).

Learning objectives:

You will know and understand:

- The fundamentals of measurements and experimentation
- The principles, scope, and best practices of test planning
- The ways to measure and control the testing process
- What a test case, test plan, and other basic testing concepts are
- How to derive test cases and test procedures from requirements use cases/scenarios
- Principles of manual testing and test automation and its place in software life cycle
- The set of procedures and error-detection techniques of inspection
- How software testing practices can be deployed in practice

Upon completion of this course, participants should be able to:

- Articulate test plans
- Perform Coverage-based testing, Fault-based testing, Error-based testing, Black-box testing, and White-box testing, Evolutionary Testing, Debugging using Slicing, Mutation Testing, Integration Testing, Acceptance Testing, Regression Testing
- Perform security testing and performance testing
- Document testing results
- Properly execute error-detection techniques of inspection

Evaluation:

- A 2.5 hour final examination (one double-sided sheet allowed if this is done in person) worth 50%
- A 50 minute midterm test (one single-sided sheet allowed if this is done in person) worth 20%
- Three assignments worth 10% each. Assignments will be handed out on Avenue soon.

Late assignments will not be accepted. We want to give you timely feedback!

Collaboration Policy:

You may submit assignments either individually or collaboratively, under one of the following two models.

- Collaborate while analyzing the problem and developing an answer or solution, then develop the final solution independently. In this model, each person will turn in a separate document. The submissions must include a section that lists **everybody** you worked with and what each person contributed. You can work with as many classmates as you like with this model, but **only** other students in 3S03 this term.
- Collaborate from start to finish with at most **two** other students in 3S03. You must submit one solution and each person will get the same grade. ***The submission must outline what each person contributed.*** Note: Since my experience is that students typically produce better solutions with this type of collaborative solution, I encourage students to follow this model. The incentive is a small (5%) bonus credit per assignment.

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

(boilerplate text from University policy follows)

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line

search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity

For 3S03: I will not be using Turnitin.com or other automatic detection software. I expect you to respect your own learning and the University's policies on academic integrity. Should you misrepresent the work you submit (e.g., by copying work done by another student) then the standard McMaster procedures on academic integrity will be followed.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

(This is what the University policy says.)

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

For 3S03: I will not use online proctoring software if we have any online tests or exams, because it's spyware and is a horrible invasion of your privacy. Also, it sucks.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy. It's helpful if you also contact me so that we can discuss the best arrangements for you, but of course you don't have to contact me if you don't want to.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

For 3S03: if an assignment is MSAFed then normally the value of that assignment will be combined with that of the final exam; I'm happy to discuss alternatives, for example, a short extension to the original deadline. If the midterm is MSAFed then normally its value will be combined with that of the final exam. In all cases, please contact me as soon as you know you will be MSAFing a piece of work. Please keep in mind that the MSAF system sometimes doesn't send much information. Also, I no longer has a mind like a steel trap and can forget things, so please double check with me sometime near the end of the term to be sure that I have recorded your MSAF correctly!

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests. The instructor understands that sometimes accommodations and requests for alternative arrangements have to come in very late, but please try to help the instructor help you by submitting requests ASAP.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or

image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

For 3S03: online lectures will be recorded on Teams and made available to all students registered in 3S03. They will not otherwise be distributed or made available to anyone, even though they could lead to us becoming famous. Should the university move to a hybrid mode of teaching, I will endeavour to record lectures wherever feasible.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.