SOFTWARE ENGINEERING 3XA3

Software Engineering Practice & Experience: Software Project Management
Winter 2022

McMaster University

Course Outline[1]

Note: This course outline contains important information that may affect your grade. You should retain it and refer to it throughout the semester, as you will be assumed to be familiar with the rules specified in this document.

Instructor

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Schedule

Lecture :	Thursdays	3:30–4:20	BSB B136
Labs 1-3:	See	Mosaic Timetable	ITB 236

Note: Each student is required to attend two 2-hour labs per week.

1 Course Overview

1.1 Calendar Description

"Open-ended software development emphasizing concurrent system design; measurement, inspection, software metrics, software project management; testing methods."

1.2 Mission

This is an experiential course; it will be driven by a term long team software development project. The main purpose of the project is to expose the student to a nontrivial problem whose solution

[1] Revised: Dec 2021

involves teamwork, organization, software engineering principles, applied computer science and appropriate technology. It will help prepare students to work independently on larger, more complex and more open-ended projects in the future.

1.3 Labs

Labs are a major component of the course. There are a total of four hours of lab per week for each student, divided into two sessions of two hours each. Tutorials on selected topics will be given by TAs and students will be required to do related exercises. Lab time will also be used for team meetings and presentation of work by students.

1.4 Learning Objectives

1. Students should know and understand:
    - Project management concepts and tools
2. Students should be able to:
    a. Carry out a medium-sized development project based on an existing product through requirements to implementation, to live demonstration and presentation.
    b. Develop a problem statement.
    c. Develop and document system requirements, taking into account relevant standards.
    d. As part of the requirements document, demonstrate an ability to identify reasonable assumptions.
    e. Demonstrates an understanding of legal requirements, especially with respect to software licensing.
    f. Proof of concept plan and demonstration, estimate outcomes, uncertainties and determine appropriate data to collect.
    g. Develop and document component detailed design.
    h. Recognize and follow engineering design principles, especially the principle of information hiding.
    i. Include appropriate health and safety considerations.
    j. Develop and document a software implementation.
    k. Develop and document verification and validation.
    l. Present the final product designed and developed.
    m. Work together in teams.
    n. Develop and implement methods to manage the effectiveness of a team, especially the use of Gantt charts. By the end of the course, each student should be comfortable with a medium sized, team software development project.

1.5 Selection of Project

Students will work in teams of three students per team for development of a software project. Each team will select its own project subject to approval by the instructor. To be suitable, a project must satisfy the following criteria:

- Redevelopment of an existing open source project. You are not to invent a new project. Your requirements should come from an existing implementation. Your job is to redevelop the existing software the "right" way.
- No specialized hardware or software requirements that you cannot meet yourself and provide a virtual machine to emulate. The instructor will not be able to provide additional resources beyond what the CAS department already provides in the computer labs.
- Related to the previous point, the instructor and TAs must be able to run your software. In the event that the instructor and/or the TAs cannot run your software, you may be asked to provide an image of a Virtual Machine (VM) that they can use. The VM should include your software and any required libraries or emulators.
- The redevelopment project should not be one that was done previously in 3XA3.
- The project should support automated testing.
- The programming language should be one that you are comfortable with.
- The scope of the project must be such that everything can be completed in a term. The emphasis will be on the process and documentation over complex and large implementations. Your project may be used as an example for future SFWR ENG 3XA3 students to follow.

1.6 Grading

- Mid-Term Test: March 24 10% (Based on topics discussed in class)
- Participation(Surprise quizzes): 5% (Based on topics discussed in class)
- Project Deliverables: (Details below) 85%

1.7 Marking Scheme

The project grade will be based on the following deliverables. The instructor reserves the right to modify dates given below, in which case the new dates will be announced in class/lab. The instructor also reserves the right to adjust the grades for any deliverable by increasing or decreasing every score by a fixed number of points.

Team Formation/Safety Quiz	Week of January 17	0%
Project Approval	Week of January 24	0%
Problem Statement	January 28	0.5%
Development Plan	Feb 4	0.5%
Requirements Document Revision 0	February 11	5%
Proof of Concept Demonstration	Week of February 28	6% $*$
Test Plan Revision 0	March 11	5%
Design & Document Revision 0	March 18	5%
Revision 0 Demonstration	Week of March 21	6% $*$
Lab Exercises	Throughout Term	0% $*, \dagger$
Final Demonstration (Revision 1)	Week of Apr 4	25% $*$
Peer Eval of Other Teams Final Demo	Week of Apr 4	2%$*$
Final Documentation (Revision 1)	April 12	30%

- Problem Statement
- Development Plan
- Requirements Document
- Design Document
- Test Plan
- Test Report
- Users Guide (optional)
- Source Code

Each of the $*$ items represent a grading item where an individual grade will be assessed. The individual grade will be the team grade multiplied by a team contribution factor. The team contribution factor, as determined by the TA and instructor, will have a value between 0 and 1.1. For items without a $*$ all team members will share the same grade. The only exception to this is if a student did not contribute and his/her name does not appear on the title page of the report. In that case the grade awarded to that student on the deliverable in question will be 0. The item marked with $\dagger$, Lab Exercises, do not contribute anything to the final grade, unless the lab exercises are not completed. For each lab exercise not completed, a 1% penalty will be assessed. There will be approximately 6 lab exercises over the course of the term, with each student allowed to miss up to one lab exercise without penalty. The team contribution factor for the lab exercises has a value of either 0 or 1.

1.8 Logistics

Avenue to Learn: This course will be administered via Avenue to Learn. Go to: http://avenue.mcmaster.ca/ to access the course's Avenue to Learn page.

Microsoft Teams: to access the virtual classroom.
This term the course is being offered in-person, however in case of a lockdown due to health reasons, we may need to switch to virtual class rooms. Please ensure that you have downloaded MS Teams on your personal device or at least have access to the web browser version. You should be logged on via your MacID. Resources on downloading and installing MS Teams can be found HERE. Once you have MS Teams installed and have logged on, please join the **SFWRENG-3XA3 2022** team using the following join code: bq2llv4.

GitLab: The primary tool for managing the projects will be GitLab. Each team will create a public GitLab repository (with the TAs and the instructor added as Master level collaborators) for their work. The GitLab server is located at:
https://gitlab.cas.mcmaster.ca/.

Students should be aware that, when they access the electronic components of this course, 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 this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the Instructor.

It is the student's responsibility to be aware of the information on the course's Avenue to Learn page and to check regularly for announcements.

2 Course Policies

2.1 Safety

Safety is a crucial concern for all engineers. Safety in the labs will be discussed in the first lab session.

2.2 Academic Dishonesty

You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

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 behavior 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.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity/.

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.

Your work must be your own. Plagiarism and copying will not be tolerated! If it is discovered that you plagiarized or copied, it will be considered as academic dishonesty.

Students may be asked to defend their written work orally.

2.3 Discrimination

The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem, that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair and the Human Rights and Equity Services (HRES) office as soon as possible.

2.4 Academic Accommodation

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail `sas@mcmaster.ca` . For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities.

2.5 Missed Work

A student who would like to receive accommodation for missed academic work due to an absence needs to complete a McMaster Student Absence Form (MSAF) on-line at http://www.mcmaster.ca/msaf/.

2.6 Course Modifications

The Instructor and University reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster e-mail and course web sites weekly during the term and to note any changes. Your McMaster e-mail is the one with the address ending in `@mcmaster.ca`. This is a separate e-mail address from your Avenue address.

2.7 Acknowledgements

Some of the material used in this course was originally authored by Dr Spence Smith and is being used with his permission.

2.8 Other Policy Statements

- Significant study and reading outside of class/labs are required.
- Student are encouraged to ask questions during lectures, tutorials, and labs.
- Suggestions on how to improve the course and the Instructor's teaching methods are always welcomed.
- The next two pages giving details of the applicable university policies form an integral part of this outline.

COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ACADEMIC INTEGRITY

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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

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.

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

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.

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.

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".

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.

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.

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.