CIS 3760 – Software Engineering (Winter 2020), 0.75 credits

Prerequisites: CIS 3750

Lectures: TTh 4:00-5:20pm, Room MCKN 029
Laboratories: Section 1: Fri 3:30-5:20pm, Room THRN 2420
Section 2: Wed, 3:30-5:20pm, Room THRN 2420

INSTRUCTOR: Prof. S. Scott, Associate Professor, School of Computer Science
Office: REYN 3308; Email: stacey.scott@uoguelph.ca; Phone: 519-824-4120 ext. 54153
Office hours: Thur 2:30-3:45pm, Fri 2:30-3:20pm

TEACHING ASSISTANTS: Samira Yousefi Naghani & Muhammad Muhaiminul Islam,
Email: cis3760@socs.uoguelph.ca

CONTACT: Use the cis3760@socs.uoguelph.ca email for all course-related concerns. Use course discussion boards for general project or content questions. To meet with Prof. Scott or TAs outside of scheduled class/lab or Prof. Scott's office hours (see above), please make an appointment.

COURSE WEBSITE: http://courselink.uoguelph.ca (Login with Central login ID and password)
The course website will be used to provide:

- **informational materials** (e.g., course notes, assignment handouts, course updates, course contacts)
- **electronic drop boxes** for non-programming course deliverable submissions
- **course discussion boards** for asking questions and discussing issues related to course material

COURSE COMMUNICATIONS:
To facilitate timely and accurate communication between people with busy schedules (you, professor, TAs) we will use both electronic and face-to-face communication:

1. For **lecture, project, or general course questions**, post to the *"CIS 3760 Course Questions" Discussion board* on the course website. Or talk to Prof. Scott or your TAs in person.
2. For **personal issues**, email or talk in person to Prof. Scott. The best time to chat with her is immediately before/after class or during her office hours (see above).

When communicating with fellow students, TAs or the professor, **you are expected to use professional practices, including respectful, clear messages, especially via email**. See "Email Policy" section below.

REQUIRED TEXT (on reserve in the UofG Library):

- Freeman, E., Freeman, E., Sierra, K. & Bates, B. (2004). Head First Design Patterns. Cambridge: O'Reilly (eText available at O'Reilly Online: shop.oreilly.com/product/9780596007126.do)

REQUIRED LAB MANUAL:

- Kniberg, H. (2014). Scrum and XP from the Trenches, 2nd edition. Stockholm: C4Media. Free Downloadable e-Book available at https://www.infoq.com/minibooks/scrum-xp-from-the-trenches-2.

RECOMMENDED TEXTS:

- Bruegg, B. and Dutoit, A.H. (2010). *Objected-Oriented Software Engineering: Using UML, Patterns, and Java, 3rd edition*. Toronto: Prentice Hall.
- Pressman, R.S. and Maxim, B.S. (2015). *Software Engineering: A Practitioner's Approach, 8th edition*. New York: McGraw Hill Education.

COURSE OBJECTIVES:

The main goal of CIS 3760 is to familiarize students with the complexities involved in software engineering projects and to provide tools and techniques to plan and manage successful team-based software projects. Achieving this goal requires learning how to apply these analytic and design skills using specific *engineering modeling and design tools* (e.g. unified modeling language (UML) and Java programming language). Additionally, this course aims to provide students with the appropriate project management, communication, and professional skills to apply their software skills in a professional software engineering context. By the end of the course, you should be able to:

a. *Explain* and *Use* the procedures involved in software design and development;
b. *Select* and *Use* suitable modeling techniques for planning and designing a software project;
c. *Analyze* problem specifications and *Integrate* into suitable software requirements and design models;
d. *Select* and *Use* suitable software architectures and design patterns for common software problems;
e. *Select* and *Use* suitable testing methods for verifying and validating a software project;
f. *Identify* sources of risk in software projects, and *Select* and *Use* mitigation strategies in solution designs;
g. *Describe* effective project management and team behaviours and *Evaluate* your contributions.

A significant challenge in successful software engineering is learning the potential sources of complexities involved in software projects and how to manage those complexities. Whether you are interested in becoming a software developer, software engineer, or project manager in the software field, this course will supply you with a range of practical as well as theoretical knowledge related to software engineering.

GRADING SCHEME:

The following table describes the grading scheme, and the corresponding learning objective. See CourseLink for more details of the specific Design Project deliverables.

			Learning Objectives						
	Marking Scheme		**a**	**b**	**C**	**d**	**e**	**f**	**g**
Evaluated through:	**Indiv.**	**Team**	Software Design	Software Modeling	Software Reqs.	Design Patterns	Software Testing	Software Risks	Project / Team Mgmt
Midterm Exam (Mar 6; outside of class time)	**25%**		x	x	X	X			
Final Exam	**30%**		x	x	X	X	x	x	
Design Project	**10%**	**35%***							
Team Contract & Project Proposal		*2%*							x
Initial Design & Backlog		*8%*	x	x	X				x
Project Milestone 1 + Sprint Retrospective		*5%*	x		X	X	x		x
Project Milestone 2 + Sprint Retrospective		-	x		X	X	x		x
Project Milestone 3 + Sprint Retrospective		*7%*	x		X	X	x		x
Final Project Demo/App		*10%*	x		X	X	x	x	x
Accountability Reports	*4%*		x	x	X	X	x	x	x
Peer Assessments (2)	*3%*								x
Project Post-Mortem	*3%*	*3%*							x
Course Total	**65%**	**35%***							

***NOTE: Due to the significant group work required for the team deliverables, the instructor reserves the right to apply a fraction of the grade to an individual group member without sufficient evidence of contribution to the group effort. See Coursework Policies below.**

Estimated Weekly Course Commitment (15-18 hours per week for this 0.75 credit course):

- 3 hours lectures
- 3-4 hours course preparation (e.g. readings, academic tasks)
- 2 + 2-3 hours labs + lab preparation (lab activities will typically support your design project)
- 5-6 hours design project (this includes in-lab activities, which will all relate to your design project)

The University of Guelph expects students to spend 10-12 hours per week on a 0.5 credit course, and more (~15-18 hrs/wk) for 0.75 credit course. This time commitment represents student workload rather than contact hours. In CIS 3760, the main learning vehicle is a team-based software design project. **Students must make a minimum commitment of 5-6 hours per week to the design project, in addition to relevant laboratory activities.** It is recommended that project teams meet at least 1 hour a week outside of lecture / lab sessions to discuss their project status.

POLICIES ON REQUIRED COURSEWORK:

Accommodation: When You Cannot Meet a Course Requirement

- When you find yourself unable to meet a course requirement because of illness or compassionate reasons, please advise Prof. Scott (or the TAs) in writing, with your name, id#, and e-mail contact. **See the undergraduate calendar for information on regulations and procedures for Academic Consideration.**

Late or Missed Assignments/Deliverables:

- **0%** will be given for any late or missed assignments or deliverables. **No extensions** will be given after a submission date.

Missed Exam:

- **0%** will be given for a missed **midterm exam**. If accommodation is warranted (see "Accommodation" policy above), the midterm mark allocation (25%) will be redistributed to the final exam (i.e. the final exam will then be worth 55% instead of its original 35%).
- If you miss the **final exam**, you must talk with your academic counsellor and follow University of Guelph policies on this matter. Prof. Scot cannot do anything in this situation.

Marking of Team-Based Deliverables:

- By default, marks for all team-based deliverables will be applied to all group members. However, the **instructor reserves the right to assign individual students a fraction of the total group mark** on any specific team-based deliverable without sufficient evidence of that student's contribution to the group effort. The onus is on each individual student to provide evidence of their individual contribution to the team effort. The instructor reserves the right to apply fractional grading **retroactively at the end of the term** to one or more team deliverables if the **project time logging** and **project post-mortem report** of an individual team member lack sufficient evidence of contribution to specific or overall team efforts.
- If a team feels that lack of effort by one or more group members is negatively impacting the group's ability to meet the progress or outcome expectations for the course, the situation **MUST be identified to the course instructor or TAs PRIOR to any impacted deliverable** to be considered for accommodation in deliverable grading. Otherwise, default grading criteria will be applied (e.g., project progress and outcomes will be assessed on the basis of a full team effort). Group members must submit a written request for accommodation, PRIOR to the deliverable deadline, detailing the situation. Note that submission of an accommodation request is not in and of itself approval.

- **It is the responsibility of ALL team members to ensure the accuracy and quality of all aspects of submitted team-based deliverables**. Therefore, any academic integrity offences arising from a team-based deliverable will impact ALL group members.

Re-grading of Marked Components:

- Any request for re-grading of a marked course component must be **submitted in writing no later than 1 week** following return of the marked component. A detailed rational for the request must be included in the written request. The instructor reserves the right to re-grade the entire deliverable component, not just the requested aspect.

Calculation of Final Grade / Failed Final Exam or Individual Portion of the Course:
You must obtain a final grade of **50% or more** to pass this course. Your final grade is the weighted sum of all marked coursework as shown in the Grading Scheme table on page 2, unless: a) you **fail the final exam** (i.e. obtain less than 50%), in which case your final grade will be your final exam grade, to a maximum of 45%, b) you obtain **less than 50% on the combined average of the five individual coursework components** (Midterm, Final Exam, Accountability Reports, Peer Assessments, Project Post-Mortem (Individual)), in which case your final grade will be your combined mark for these five individual course components, to a maximum of 45%.

In summary, your final grade will be calculated as follows:

if (you fail the final exam)
then final grade **=** final exam grade, to a maximum of 45%

else if (you fail the individual portion of the course)
then final grade = (weighted sum of individual components in Grading Scheme) / 65 * 100, to maximum of 45%
// note individual components = Midterm, Final Exam, Accountability Reports, Peer Assessments
// and Project Post-Mortem (Individual)

else // (you passed the final exam and the individual portion of the course)
then final grade = weighted sum of all components in Grading Scheme

Use of Laptops / Personal Computing Devices during Lectures:
Use of laptops, tablets, and other personal computing devices during lectures will be at the instructor's discretion. The devices can be highly distracting to both the student using the device and to other students in the class. Use of these devices must be restricted to course related activities (e.g., note taking, viewing course materials, etc.). Distractions resulting from the use of these devices may result in a student being asked to leave the classroom.

Email Policy:
All course email should follow the following guidelines:

- As per university regulations, **all students are required to check their <uoguelph.ca>** e-mail account regularly: e-mail is the official route of communication between the University and its students.
- **Always use your uoguelph.ca email account** when emailing Prof. Scott or the TAs (i.e. when emailing cis3760@socs.uoguelph.ca). This provides an authentic email address. Also, always **include the course number (CIS 3760)** along with a topic in the subject line.
- Address your email appropriately (i.e. "Dear Prof. Scott / Professor / TAs / Ayoola / Omar...")
- Sign your email with your **first and last name**. If you have a nickname, include that also, e.g., Yu-Ling (Betty) Chang.

- Use **professional and respectful language**. Email containing crude language will not be answered.
- Allow 24-48 hours for a response to your email. Emailing the cis3760@socs.uoguelph.ca will give you the fastest response, as the whole instructional team monitors this account.
- Email should be used for brief questions that can be answered quickly. Please make an appointment to see Prof. Scott or a TA, or talk to them before/after lecture or during the lab, for detailed discussions.

ROLES AND RESPONSIBILITIES

Recording of materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course and may not be posted on any public space unless further permission is granted.

Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected notes will be made available to students on the course website but are not intended to be stand-alone. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for exams and assignments.

Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures, labs and help sessions. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who fall behind due to illness, work, or extracurricular activities are advised to keep the instructor informed as early as possible. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

Ethical Behaviour[1]

Ethical conduct in the classroom and in academic work are critical to a healthy learning environment. Ethical conduct in all areas of University work is taken very seriously at the University of Guelph.

Code of Conduct

Our learning environment must be a friendly, safe and welcoming environment for all, regardless of ethnicity, gender, sexual orientation, ability, socioeconomic status, and religion (or lack thereof). As we wish to facilitate and encourage the fullest participation from everyone, this code of conduct outlines the expectations for all participants (including the instructor and other staff). This code of conduct is aligned with the University of Guelph's policy on Non-Academic Misconduct (https://www.uoguelph.ca/secretariat/office-services/student-judicial-services/non-academic-misconduct/policy-non-academic-misconduct).

Expected Behaviour

- Participate in an authentic and active way. In doing so, you contribute to the health and value of this community.
- Exercise consideration and respect in your speech and actions.

[1] This "Ethical Behaviour" section is based on content developed by SoCS's professor Dr. A. Hamilton-Wright, which was in turn developed based on the citizen code of conduct available via http://citizencodeofconduct.org, and is distributed under a Creative Commons Attribution-ShareAlike license (http://creativecommons.org/licenses/by-sa/3.0/).

- Attempt collaboration before conflict.
- Refrain from demeaning, discriminatory, or harassing behaviour and speech.
- Be mindful of your surroundings and of your fellow participants. Alert community leaders (for example, your instructor) if you notice a dangerous situation, someone in distress, or violations of this Code of Conduct, even if they seem inconsequential.

Citizenship and Participation
Communities mirror the societies in which they exist and positive action is essential to counteract the many forms of inequality and abuses of power that exist in society. If you see someone who is making an extra effort to ensure our community is welcoming, friendly, and encourages all participants to contribute to the fullest extent, we want to know.

Unacceptable Behaviour
Unacceptable behaviours include: intimidating, harassing, abusive, discriminatory, derogatory or demeaning speech or actions by any participant in our community, either in person, online, at any related events, or in one-on-one communications carried out in the context of community business. **Harassment includes**: harmful or prejudicial verbal or written comments related to race, religion, disability, gender, sexual orientation; inappropriate use of nudity and/or sexual images in public spaces (including computer labs and presentation slides); deliberate intimidation, stalking or following; harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact, and unwelcome sexual attention.

Consequences of Unacceptable Behaviour
Unacceptable behaviour from any community member, including the course instructor and those members with decision-making authority, will not be tolerated. **Anyone asked to stop unacceptable behaviour is expected to comply immediately.** If a community member engages in unacceptable behaviour, action will be taken to ensure that such behaviour ends, beginning with action on the part of the course instructor, and escalating if necessary. Additional information on University policy regarding harassment, conduct and human rights is available at the following web page:
https://www.uoguelph.ca/diversity-human-rights/

If You Witness or Are Subject to Unacceptable Behaviour
If you are subject to or witness unacceptable behaviour, or have any other concerns, **please notify the course instructor as soon as possible**. If you feel that the course instructor cannot or will not provide remedy for the situation, please contact any of these alternate resources:
- Associate Director (Undergraduate) <ugraddir@socs.uoguelph.ca>
- Director of the School <director@socs.uoguelph.ca>
- Associate Dean (Academic) <cpesada@uoguelph.ca>
- Office of Diversity and Human Rights <dhrinfo@uoguelph.ca> or extension 53000
- Campus Community Police at extension 52245

Academic Integrity
Just as ethical and inclusive behaviour is required in inter-personal communications for course-based activity, the university community requires ethical behaviour in the performance of all academic activity. All forms of academic misconduct are dealt with quite seriously at University of Guelph. Plagiarism and other forms of academic fraud are offensive activities pursued vigorously by the University.

It is **your responsibility to read and be familiar with the academic regulations** of the University as presented in the Calendar. Ensure you have a complete understanding of the concepts as described in the "Academic Misconduct" subsection within Section VIII "Undergraduate Degree Regulations and Procedures" in the Calendar: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml. It is your responsibility to accurately and clearly indicate the work of **any and all contributing people**, including yourself, in all presented and submitted materials. By handing in any work for this course, unless you have specifically identified any other authorship, **you are claiming that the sole authorship is your own**.

Please note: Whether or not you intended to commit academic misconduct is not relevant for a finding of guilt. **Hurried or careless submission of assignments does not excuse you from responsibility for verifying the academic integrity of your work before submitting it** – this includes submitted team-based deliverables. If you are in any doubt as to whether an action on your / your team's part could be construed as an academic offence you should consult with your course instructor.

Mental Health
University of Guelph course instructors and student services cooperate to assist in helping students manage course and life stressors. Help is also available through counselling services. Please see the Mental Health Resources page for details: https://wellness.uoguelph.ca/counselling/mental-health-resources.

Accessibility
The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability, or for a short-term disability should contact **Student Accessibility Services (SAS)** as soon as possible. Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day. SAS may be contacted at: phone: 519-824-4120 ext. 56208, email: accessibiity@uoguelph.ca, or see their website: https://wellness.uoguelph.ca/accessibility.

Drop Date
Courses that are one semester long must be dropped by the last day of the semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to re-submit work at any time.

Resources
The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

Course Timetable/Content Schedule (tentative; check CourseLink for updates)

Wk – Dates	**Topic(s)** *[more details available on CourseLink]*	**Deliverables / Exams** *[Deliverable instructions are available on CourseLink]* ***[NOTE: IARs are due Fridays of wks 5, 6, 11, and 13]***
1–Jan 7, 9	Introduction, Software Engineering Processes	Jan 10: Background Survey (indiv.)
2–Jan 14, 16	Agile Software Engineering	
3–Jan 21, 23	Project Management, Configuration Management, Communication, and Teamwork	In-lab: Team Contract & Application Proposal (team)
4–Jan 28, 30	Introduction to Object-Oriented Design and Modeling with UML (Common Diagrams)	
5–Feb 4, 6	Architectural Patterns	In-lab: Initial System Design & Product Backlog Creation (Sprint 0) (team)
6–Feb 11, 13	Design Patterns	In-lab: Project Milestone 1 (Sprint 1) (team)
7–Feb 17-21	***Reading Week, No Classes***	
8–Feb 25, 27	Software Quality	In-lab: Project Milestone 2 (Sprint 2) (team - no marks) Feb 28: Peer Assessment #1 (indiv.)
9–Mar 3, 5	Software Testing, Midterm Review	**NO LABS / Midterm Exam: Fri Mar 6 6:30-8pm, THRN 1307 (out of class)**
10–Mar 10, 12	Design Reviews	
11–Mar 17, 19	Software Metrics	In-lab: Project Milestone 3 (Sprint 3) (team)
12–Mar 24, 26	Maintenance and Re-Engineering	
13–Mar 31, Apr 2	Software Security, Final Exam Review	In-lab: Final Project Demo/App (Sprint 4) (team) Apr 4: Project Post-Mortem (indiv. and team components) Apr 4: Peer Assessment #2 & Scrum Master Assessment (indiv.)
Final Exam Period	Final Exam	**Final Exam: Tue, Apr 7, 8:30am-10:30am; Location TBD**