Course Title: Software Engineering **Course Number:** CSCI 3130
Course Section: 1 **Semester & Year:** Fall 2021
Class Day & Time: Mon/Wed **14:35 - 15:55 PM** **Class Location:** McCain Arts & SS Aud-1
Lab Day & Time: Tue/Thurs **13:05 - 14:25 PM** **Lab Location:** Collaborate Ultra

Credit Value: 3.00
Pre-requisites: CSCI 2110, CSCI 2132, CSCI 2134 or INFX 3600 or permission of instructor

Instructor: Dr. Masud Rahman **Office Location:** Room 218, Goldberg CS
Email: masud.rahman@dal.ca **Office Hours:** by appointment

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Course Website: on Brightspace **Course Mailing List:** all-cs3130@cs.dal.ca

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CALENDAR DESCRIPTION

The course examines the process of software development, from initial planning through implementation and maintenance. A brief survey of available tools and techniques will be presented covering the topics of analysis, planning, estimating, project management, design, testing, and evaluation. Particular emphasis will be given to organizing and planning, team participation and management, top-down design and structure charts, system and information flow diagrams, walk-throughs and peer review, and testing and quality control.

LEARNING OUTCOMES

- Work with peers on a shared project following Agile software development.
- Use object-oriented software frameworks.
- Apply standard software processes for build and testing.
- Apply standard software processes for risk management.
- Apply standard software processes for version control and change management.
- Describe common software engineering methodologies.
- Understand the role of software testing and documentation as part of the life cycle of software.
- Make basic architectural decisions for a software system.
- Select the most appropriate software development methodology for a mid-sized development team.
- Create a test plan for a software development project.
- Apply concepts of software engineering to plan, execute and manage a small software project.
- Understand history and critiques of Software Engineering as distinct from Computer Science.
- Reflect on software process as design, experimentation, hacking, and engineering.

COURSE RATIONALE
Software Engineering is a fundamental course for several top career paths in Canada and North America.

TEXTBOOK
There is no required textbook for the course. However, a software engineering text is *an essential resource*. The textbook recommended for the course is *Software Engineering*, 9th Edition or later, Ian Sommerville, Addison-Wesley. The class schedule (below) provides the chapters from this text for each week of lectures.

Additional Resources

- *Refactoring: Improving the design of existing code.* Martin Fowler, Kent Beck, et al., 1999, Addison-Wesley. Electronic copy available through Dalhousie University Libraries.

- Android developer guide. (Your computer **must** meet the system requirements of Android Studio).

Additional materials will be made available on the course website and/or in class as necessary.

COURSE EVALUATION
Assignments (4) . . . . **32**% (4 × 8%)
Quizzes (3) . . . . **18**% (3 × 6%)
Project Iterations (3) . . . . **45**% (8%, 15%, and 22%, respectively)
Final Project Presentation and Demo **5**%

Important Notes
- **As of January 2015, students must obtain a grade of C or better in required courses.**

- There will be no conversion of final grades into PASS or ILL. **All letter grades will be final.**

- Attendance at in-person lectures and live tutorials is not mandatory. However, if you can make it to **90**% of the total sessions, you will earn **3**% bonus points to your overall grade.

- It is up to the discretion of the instructor to use **remote proctoring** in online testing (e.g., quiz). Students may be required to download proctoring software onto their devices. Students who cannot meet system requirements for remote proctoring should contact the instructor for an alternate assessment. (Typical system requirements are: (i) Mac OS or Windows, (ii) a web-cam, and (iii) an internet connection.)

MIDTERM AND FINAL EXAMINATION
There is no midterm or final exam in this course.

POLICY ON LATE SUBMISSIONS
Unless otherwise specified, assignments and project submissions are expected by **5:00PM** on the day in which they are due. There is a **24-hour grace period** past due date/time for assignments to accommodate any issues that the students may encounter with learning under the COVID-19 pandemic. A deduction of **10**% per day late will be applied to assignments that are submitted up to **72 hours** past this grace period. Assignments submitted more than **4 days** after the posted deadline **will not be accepted**. There is **no grace period** for project deliverable submission. It is the responsibility of each group to ensure that contributions are collected and submitted on time, and that individual absences are managed. Late submission is **not allowed** for project deliverable.

STUDENT DECLARATION OF ABSENCE
The Student Declaration of Absence policy shall apply for this course. Please check the policy carefully before submitting your declaration.

WORKING COLLABORATIVELY

Working in software teams is a major focus of this course. You may assign software project tasks and responsibilities to individual team members where appropriate. Do not then work independently of each other; the success of a short-term software project depends on frequent group engagement and discussion. It is also important for you to learn from each other's experiences with individual tasks. Working on design, implementation and testing in pairs or groups is encouraged and you will be **graded** partly on your ability to do so. Discussing process and requirements with other groups is also encouraged.

Part of working in a successful project team is managing and capitalizing on individual strengths so that everyone can make a meaningful contribution. The high proportion of group marks in this course reflects a **shared responsibility** to do this. **Disproportionate contributions by individual team members do not constitute a reason for a higher individual mark**. However, there may be cases where a student **falls far short of their responsibilities** to the team. Such cases will be determined through *group work history*, *peer testimonials*, *client TA feedback*, and if necessary, a subsequent oral examination, and can lead to a **significant reduction** in a student's marks.

CLASS FORMAT AND COURSE COMMUNICATIONS

- Content will be delivered via a combination of in-person lectures, synchronous tutorial sessions (i.e., Collaborate Ultra), and online course materials at Brightspace.
- Students must ask the instructor permission before recording class lectures.
- Course announcements will be posted at Brightspace and/or to the course mailing list, which comprises the instructor's and students' CS email accounts. It is the **student's responsibility** to check Brightspace and their CS e-mail account on a **regular basis**. If you do not know how to access your CS e-mail account or Brightspace, please contact the CS help desk or read the information located at the student service page.
- Students will be expected to use the Top Hat Student Response System (Join URL: https://app-ca.tophat.com/e/530486). It will be used to calculate attendance and to conduct tiny quizzes during in-person lectures.

LABS

This course has two types of labs: client TA lab and tutorial lab. The client TA lab provides a set time for project groups to plan, review, and work together in the presence of a knowledgeable lab instructor. Attendance is mandatory for the entire duration of each lab. Groups will have a designated lab instructor who will serve as the project's client, meaning that labs are also where project groups meet and work with their client. In the tutorial lab, specialized tutorials (e.g., Git, TDD, CI) will be provided as needed, and will be posted on Brightspace. Labs are not for the individual assignments.

ACADEMIC STANDARDS

Failure to properly attribute sources in your work will be treated as an academic standards issue and points may be deducted for not following citation requirements. For example, forgetting to quote text taken from other sources, failure to include in-text citations, or a failure to include required information in the citations or references. Please see the resources on proper citation provided by the Dalhousie Writing Center.

Please note that if it appears that the error was made with an intent to claim other people's work as your own such as a lack of both citations and references, an allegation of plagiarism will be submitted to the Faculty Academic Integrity Officer, which could result in consequences such as a course failure.

TENTATIVE CLASS SCHEDULE (subject to change – Brightspace provides the definitive schedule)

Week Of	Topic	Events	Reading
Sep 07 (W1)	Course introduction. What is Software Engineering? What is a software process?	Course project assigned	Hackers and Painters, Paul Graham, and SES Chapter 1
Sep 13 (W2)	Software process models, Agile, Extreme Programming (XP), User stories, and Acceptance tests.	Assignment 1 due	SES Chapters 2, 3, 4
Sep 20 (W3)	Planning game, Risk management, Effort estimation, Iteration planning, Test-Driven development (TDD), Unit testing, and Pair Programming.	Planning game	No Silver Bullet: Essence and Accidents of Software Engineering, Fred Brooks, and SES Chapter 3
Sep 27 (W4)	Test-Driven development (TDD), Software testing, Continuous Integration (CI), Software builds, versioning, and Documentation	Quiz 1	SES Chapter 8
Oct 04 (W5)	Code smells and Refactoring	Assignment 2 due	Refactoring: Improving the Design of Existing Code (Chapter 1), Martin Fowler and Kent Beck
Oct 11 (W6)	Clean code and SOLID principles	Iteration 1 due	
Oct 18 (W7)	UML and Design patterns	Quiz 2	SES Chapters 5, 7
Oct 25 (W8)	Design patterns, and Software architectures	Assignment 3 due	Who Builds a House without Drawing Blueprints?, Leslie Lamport, SES Chapter 6
Nov 01 (W9)	Framework and Components, Coupling and cohesion	Iteration 2 due	SES Chapter 16
W10: Reading Week (Fall Study Break)			
Nov 15 (W11)	Distributed & Service-oriented software engineering, micro-services	Assignment 4 due	SES Chapters 17, 18
Nov 22 (W12)	Software maintenance, evolution, and debugging		SES Chapter 9
Nov 29 (W13)	User-centered design, software engineering professionalism, and ethics	Iteration 3 due	
Dec 06 (W14)	Recap, trends and futures of software engineering.	Quiz 3, presentations, demos, postmortems.	Computational Thinking, Jeannette Wing

SES: Software Engineering, Sommerville

Important Dates: Last day to add/drop courses without a financial penalty: **Sep 17, 2021**, Last day to change Fall term courses from audit to credit (and vice versa): **Oct 01, 2021**. Check more dates

CULTURE OF RESPECT[1]

Every person has a right to respect and safety. We believe inclusiveness is fundamental to education and learning. Misogyny and other disrespectful behaviour in our classrooms, on our campus, on social media, and in our community is unacceptable. As a community, we must stand for equality and hold ourselves to a higher standard.

What we all need to do:

- **Be Ready to Act:** This starts with promising yourself to speak up to help prevent it from happening again. Whatever it takes, summon your courage to address the issue. Try to approach the issue with open-ended questions like "Why did you say that?" or "How did you develop that belief?"

- **Identify the Behaviour:** Use reflective listening and avoid labeling, name-calling, or assigning blame to the person. Focus the conversation on the behaviour, not on the person. For example, "The comment you just made sounded racist, is that what you intended?" is a better approach than "You're a racist if you make comments like that."

- **Appeal to Principles:** This can work well if the person is known to you, like a friend, sibling, or co-worker. For example, "I have always thought of you as a fair-minded person, so it shocks me when I hear you say something like that."

- **Set Limits:** You cannot control another person's actions, but you can control what happens in your space. Do not be afraid to ask someone "Please do not tell racist jokes in my presence anymore" or state "This classroom is not a place where I allow homophobia to occur." After you have set that expectation, make sure you consistently maintain it.

- **Find or be an Ally:** Seek out like-minded people that support your views, and help support others in their challenges. Leading by example can be a powerful way to inspire others to do the same.

- **Be Vigilant:** Change can happen slowly, but do not let this deter you. Stay prepared, keep speaking up, and do not let yourself be silenced.

RESPONSIBLE COMPUTING POLICY

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies and the Faculty of Computer Science Responsible Computing Policy.

Use of Plagiarism Detection Software

All submitted code may be passed through a plagiarism detection software, such as the plagiarism detector embedded in Codio, the Moss Software Similarity Detection System, or similar systems. If a student does not wish to have their assignments passed through plagiarism detection software, they should contact the instructor for an alternative. Please note that code not passed through plagiarism detection software will necessarily receive closer scrutiny. Please check more on plagiarism and penalties.

Copyright Notice

The course materials are designed for use as part of the CSCI courses at Dalhousie University and are the **property of the instructors** unless otherwise stated. Third-party copyrighted materials (such as books, journal articles, music, videos, images, etc.) have either been licensed for use in this course or fall under an *exception* or *limitation* in Canadian Copyright law (e.g., fair use for education). Copying this course material for distribution (e.g. **uploading material** to a third-party website) may lead to a **violation of Copyright law** and may result into penalties.

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[1]Source: Speak Up! © 2005 Southern Poverty Law Center. First Printing. This publication was produced by Teaching Tolerance, a project of the Southern Poverty Law Center. Full "Speak Up" document found at Student Rights & Responsibilities page. Revised by Susan Holmes from a document provided April 2015 by Lyndsay Anderson, Manager, Student Dispute Resolution, Dalhousie University, 902.494.4140, lyndsay.anderson@dal.ca www.dal.ca/think.

UNIVERSITY STATEMENTS

This course is governed by the academic rules and regulations set forth in the University Calendar and the Senate.

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit the office in the McCain Building (room 3037) or contact the programs at elders@dal.ca or 902-494-6803 (leave a message).

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Please check more on internationalization.

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Please check more on academic integrity.

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact accessibility for all courses offered by Dalhousie with the exception of Truro.

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and feel safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Please check more on culture of respect.

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students do not follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner perhaps through a restorative justice process. If an informal resolution cannot be reached, or would be inappropriate, procedures exist for formal dispute resolution. Please check more on code of conduct.

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the .
originality of any work submitted for credit, in accordance with the Student Submission of Assignments
and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an
alternative method of attesting to the authenticity of their work, and must inform the instructor no later
than the last day to add/drop classes of their intent to choose an alternate method. You can read more
on originality checking

Learning and Support Resources

- General Academic Support – Advising.
- Fair Dealing Guidelines.
- Dalhousie University Library.