Course Title: Software Engineering
Course Section: 1
Class Day & Time: Mon/Wed **10:05 – 11:25 AM**
Lab Day & Time: Tue/Thur 13:05 – 14:25 PM & 16:05-17:25 PM

Course Number: CSCI 3130
Semester & Year: Fall 2020
Class & 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
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Office Location: MS Teams
Office Hours: by appointment

TA Team: Lead TA: Sanjay Muthukumar (sn752089@dal.ca), Tutorials: Nihir Shah (nh244735@dal.ca), Client/Evaluation: Hariprashanth Deivasigamani (hr533370@dal.ca), Keerthi Gowda Govindaraju (keerthigowda@dal.ca), Harshitha M S (Harshitha.MS@dal.ca), Shah Haard Prashant (hr606438@dal.ca), and Ethienne Graveline (et571942@dal.ca)

Course Website: on Brightspace
Course Mailing List: all-sci3130@cs.dal.ca

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.

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. Those with a different text can find comparable materials by reviewing the table of contents for the Sommerville Textbook.

ADDITIONAL RESOURCES

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

- Extreme Programming "wiki web", and Android Developer portal

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

COURSE EVALUATION

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

Note: As of January 2015, students must obtain a grade of C or better in required courses.

Note: 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 ASSIGNMENTS

Unless otherwise specified, assignments and project submissions are expected by **noon** on the day in which they are due. There is a **24-hour** grace period past due date/time to accommodate any issues you may encounter with distance 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**. It is the responsibility of each group to ensure that contributions are collected and submitted on time, and that individual absences are managed. If you are working from different timezone, you might find this Time Converter useful.

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, individual testimonials and if necessary, a subsequent oral examination, and can lead to a significant reduction in a student's marks.

LABS
The course 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. 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.

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 14 (W2)	Software process models, Agile, Extreme Programming (XP), User stories, and Acceptance tests.	Assignment 1 due	SES Chapters 2, 3, 4
Sep 21 (W3)	Planning game, Risk management, Effort estimation, Iteration planning, Test-Driven development (TDD), Unit testing, Pair Programming.	Planning game	No Silver Bullet: Essence and Accidents of Software Engineering, Fred Brooks, and SES Chapter 3
Sep 28 (W4)	Test-Driven development (TDD), Software testing, Continuous Integration (CI), Software builds, versioning, and Documentation	Quiz 1	SES Chapter 8
Oct 05 (W5)	Code smells, and Refactoring	Assignment 2 due	Refactoring: Improving the Design of Existing Code (Chapter 1), Martin Fowler and Kent Beck
Oct 12 (W6)	Clean code, SOLID principles, and UML	Iteration 1 due	
Oct 19 (W7)	UML and Design patterns	Assignment 3 due	SES Chapters 5, 7
Oct 26 (W8)	Software architectures, Framework and Components, Coupling and cohesion, Usability Engineering	Quiz 2	Who Builds a House without Drawing Blueprints?, Leslie Lamport, SES Chapters 6, 16
Nov 02 (W9)	Distributed software engineering	Iteration 2 due	SES chapter 17
W10: Reading Week (Fall Break)			
Nov 16 (W11)	Service-oriented software engineering, micro-services	Assignment 4 due	SES Chapter 18
Nov 23 (W12)	Software maintenance, debugging, and evolution		SES Chapter 9
Nov 30 (W13)	Ethics, professionalism, and licensing	Iteration 3 due	
Dec 07 (W14)	Recap, trends and futures of software engineering.	Quiz 3, presentations, demos, post-mortems.	Computational Thinking, Jeannette Wing

SES: Software Engineering, Sommerville

Important Dates: Last day to add/drop courses without a financial penalty: **Sep 18, 2020**, Last day to change fall term courses from audit to credit: **Oct 02, 2020**. Check more dates

COURSE COMMUNICATIONS

Course announcements will be posted on Brightspace and/or to the course mail 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.

CULTURE OF RESPECT[1]

Every person has a right to respect and safety. We believe that inclusiveness is fundamental to education and learning. Misogyny and disrespectful behaviour in our classrooms, on our campus, on social media, and in our community are not acceptable. We stand for equality. We hold ourselves to a higher standard.

What we all need to do:
- **Be ready:** Promise yourself to not remain silent, know that it will happen again, summon your courage whatever it takes. Practice things to say, open ended is good: "Why did you say that?" or "How did you develop that belief?"
- **Identify the behaviour:** Use reflective listening, avoid labeling, name-calling or blame. Describe the behaviour, don't label the person: "Kim, what I hear you saying is that . . . "
- **Appeal to principles:** This works well if the person is known to you like a friend, sibling, co-worker etc. "Joe, 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, but you can control what happens in your space. "Please don't tell racist jokes in my presence anymore" or "This classroom is not a place where I allow homophobia to occur" and then follow through.
- **Find an ally/be an ally:** Seek out like-minded people for support or support others in their challenges. Lead by example and inspire others to do the same.
- **Be vigilant:** Change happens slowly, but be prepared, and keep speaking up. Don't 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.

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 Advising and Access Services Centre is Dalhousie's center of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of: a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (NS, NB, PEI, NFLD). Please check more on accessibility.

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.

Diversity and Inclusion

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.

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).

Learning and Support Resources

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