

CSCI-2134 — Software Development Course Syllabus

Instructor Information

Instructors:	Chris Whidden	E-mail: cwhidden@dal.ca
Office Hours:	TBA	
Class Meeting Time:	01: TR 10:05-11:25	Carleton COLLABORATIVE HEALTH EDUC BLDG C170
Lab Meeting Times:	B01: M 10:05-11:25	Studley GOLDBERG COMPUTER SCIENCE BLDG 134
	B02: M 08:35-09:55	Studley GOLDBERG COMPUTER SCIENCE BLDG 143
	B03: T 13:05-14:25	Studley MONA CAMPBELL BUILDING 1201
Course Homepage:	https://dal.brightspace.com	
Microsoft Team:	FCS CSCI 2134 2023 Winter	Join Code: 2xcpci3
Teaching Assistants:	FirstName LastName	email@dal.ca
	FirstName LastName	email@dal.ca
Course Representative:	TBA	
Course Email:	prof2134@cs.dal.ca	

Important Dates

1. Midterm Exams: February 16 and March 23
2. Final Exam: TBA in the period of April 13 to 25, 2023
3. Final Withdrawal Date without academic penalty: February 6, 2023
4. Final Withdrawal Date with financial penalty: March 13, 2023
5. Munro Day (no classes): February 3, 2023
6. Winter Study Break (no classes): February 20–24, 2023
7. Deadlines: Four assignments due at 11:59PM on January 27, February 27, March 17 and April 6.

Course Description

This course presents techniques and methodologies for software development with modern tools. It introduces students to the software development life cycle and best practices for source code management, testing, debugging, and building. Particular focus will be on building individual skills in the development and testing phases of the life cycle. Students will be expected to work with existing medium-size code-bases that are implemented in different programming languages. Students will be exposed to a variety of software tools and will be expected to use them throughout the course.

Class Format and Course Communication

- Content will be delivered using labs, assignments, and lectures.
- Lectures and labs will be in-person, depending on public health guidelines.
- You are expected to attend your scheduled lab section.
- Pre-recorded lectures from a previous term will be posted on Brightspace. These are intended for your reference, in case of short term illness, or for students arriving a few weeks late to campus, but do not replace in person instruction.
- Short assessments will be assigned for each lecture and discussed during scheduled lecture times. These quizzes must be answered on Brightspace within one week.
- Students are expected to install and run software on their own computers for labs, assignments and the final.
- Lab instruction and assistance will be held in person.
- Students must ask the instructor permission before recording class lectures.
- Course announcements will be posted to Brightspace. It is the student's responsibility to check their Dal e-mail and Brightspace on a daily basis. To access your Dal e-mail account please see: <https://www.dal.ca/dept/its/o365/services/email.html>
- You can ask questions and discuss course content with your peers using Microsoft Teams. If you are unfamiliar with Teams please see: <https://dal.sharepoint.com/sites/its/SitePages/teams.aspx>. The instructors will answer questions posted on Teams when they are able (e.g. during office hours) but this is not an online course so please do not expect rapid responses.

Course Rationale

This is a foundational course on software development. Students are introduced to the software development life cycle, industry standard tools, and best practices for individual source code management, testing, debugging, and building. Students will apply these tools and skills in subsequent courses, co-op internships and industry careers.

Learning Outcomes

- Differentiate among the phases of software development.
- Explain the concept of a software life-cycle and provide an example, illustrating its phases including the deliverables that are produced.
- Explain why the creation of correct program components is important in the production of high-quality software.
- Describe how a contract can be used to specify the behavior of a program component.
- Identify common coding errors that lead to insecure programs (E.g., buffer overflows, memory leaks, malicious code) and apply strategies for avoiding such errors.
- Trace the execution of a variety of code segments and write summaries of their computations.
- Contribute to a small-team code review focused on component correctness.
- Analyze the extent to which another programmer's code meets documentation and programming style standards.
- Conduct a personal code review (focused on common coding errors) on a program component using a provided checklist.
- Apply a variety of strategies to the testing and debugging of simple programs.
- Refactor a program by identifying opportunities to apply procedural abstraction.
- Apply consistent documentation and program style standards that contribute to the readability and maintainability of software.
- Construct, execute, and debug programs using a modern IDE and associated tools such as unit testing tools and visual debuggers.
- Construct and debug programs using the standard libraries available with a chosen programming language.
- Describe how version control can be used to help manage software release management.
- Use version control to manage changes to a medium-size code-base.

Assessment Criteria

1. Quizzes via Brightspace (10%)
2. Weekly Labs (20%)

- **Students are expected to install and run software on their own computer during labs.**
- Labs are due at 11:59pm, on the Friday night after the lab occurs.
- **Late labs will not be accepted. If a student declaration of absence form is submitted prior to the lab due date via Brightspace (maximum of twice) then your lab mark will be averaged over the remaining labs. See the SDA rules for more information.**
- Labs need to be submitted electronically using Git.
- The lowest lab mark will be dropped.

3. Assignments (20%)

Assignment	Title	Value	Date Due
1	Preparing Your Dev Environment	2%	January 27, 2020
2	Developing Unit Tests	6%	February 27, 2020
3	Testing and Debugging	6%	March 17, 2020
4	Extending an Existing Code Base	6%	April 6, 2020

- **Late assignments will not be accepted. If a student declaration of absence form is submitted prior to the assignment due date via Brightspace (maximum twice) then the student can get up to a 3 day extension on the assignment deadline. See the SDA rules for more information.**
- Assignments needs to be submitted electronically using Git.
- Coding must follow guidelines outlined by the style guide on Brightspace.
- **All submitted code may be passed through the Moss Software Similarity Detection System to check for plagiarism.** If a student does not wish their assignments to be submitted to Moss, they should contact the instructor.
- No assignment marks will be dropped.

4. Midterm Exams (10% and 10%)

- You may choose not to write **one** of the midterms.
- If you choose not to write one midterm, or do better on the final exam, then your lowest midterm will be worth 0% and your final will be worth 40%.
- Midterms will be held during class time but will be online Brightspace quizzes. You may bring your laptop and write in the classroom or write at home or elsewhere.

5. Final Exam (30% or 40%)

- Scheduled by the university but will be held online using your own computer.
- Will cover all material in the course.

Notes

- **Students must pass (50%) the exam and have an overall passing grade in the course to pass the course.**
- A minimum C grade is required in this course if it is core to your FCS degree, or if it will be used as a prerequisite for a subsequent CSCI course.
- As of 2019, students who receive a grade lower than C in the same required CS course twice, will be dismissed.
- The grade conversion scale in Section 17.1 of the Academic Regulations, Undergraduate Calendar will be used.
- **It is up to the discretion of the instructor to use remote proctoring in online testing. 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.)**
- The instructor reserves the right to adjust a student's evaluation criteria, with the student's consent if the instructor deems that an adjustment is warranted.

Student Declaration of Absence

The Student Declaration of Absence policy shall apply as noted above. Excused labs will be dropped. Late assignments may receive a 3 day extension. Quizzes and Exams are not subject to SDAs. https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html

Midterm and Final Exam Requirements

- Photo ID is required.
- The midterms will be held as Brightspace quizzes.
- You can use your notes and textbook for the midterms and final but no web resources or outside assistance.

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 (<https://dal.ca/libguides.com/c.php?g=257176&p=5001261>).

Please note that if it appears that the error was made with 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.

Recommended Texts and Resources

- We will be following Code Complete by Steve McConnell, second edition, published by Microsoft Press.
- The lecture slides, videos, and course materials will be posted on the learning management system (Brightspace).

Prerequisites

Pre-requisite CSCI 1101 or CSCI 1110

Exclusion CSCI 2132

Schedule on next page:

Tentative Schedule and List of Topics

	Item	Topic	Notes
Jan 10 Jan 12	Lecture 1: Lecture 2:	Administrivia and Motivation Challenges and Tools of Software Development	
Jan 17 Jan 19	Lab 0: Lecture 3: Lecture 4:	Help with setting up IntelliJ and Git Introduction to Good Code Good Code II	Computer required
Jan 24 Jan 26 Jan 27	Lab 1: Lecture 5: Lecture 6: Assignment 1:	Using Git with the IDE Defect Detection and Collaborative Development Testing 101 Preparing Your Dev Environment	Computer required Due
Jan 31 Feb 02	Lab 2: Lecture 7: Lecture 8:	Checklist Based Code-Review Unit Testing and Test-Driven Development Software Testing	Computer required
Feb 07 Feb 09	Lab 3: Lecture 9: Lecture 10:	Program Testing Debugging Strategies Common coding mistakes	Computer required
Feb 14 Feb 16	Lab 4: Lecture 11:	Find and Fix Common Errors Defensive Programming I MIDTERM 1	Computer required MIDTERM 1
Feb 21-25		WINTER STUDY BREAK	
Feb 27 Feb 28 Mar 02	Assignment 2: Lab 5: Lecture 12: Lecture 13:	Writing Unit Tests Code Review (Defensive Programming) Defensive Programming II Code Comprehension	Due Computer required
Mar 07 Mar 09	Lab 6: Lecture 14: Lecture 15:	Using Assertions and Exceptions Procedural Refactoring Software Development Pre-requisites	Computer required
Mar 14 Mar 16 Mar 17	Lab 7: Lecture 16: Lecture 17: Assignment 3:	Refactoring Procedures UML and OOP Refresher The SOLID Principles Test/Debug/Fix a Piece of Software	Computer required Due
Mar 21 Mar 23	Lab 8: Lecture 18:	Requirements Testing Solid II MIDTERM 2	Computer required MIDTERM 2
Mar 28 Mar 30	Lab 9: Lecture 19: Lecture 20:	Refactoring Bad Classes Class-level Refactoring Class-Level Design I	Computer required
Apr 04 Apr 06 Apr 06	Lecture 21: Lecture 22: Assignment 4:	Class-Level Design II Software Development Review Extend a Piece of Software	Due
Apr 13-25		FINAL EXAM PERIOD	

Responsible Computing Policy

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies (<http://its.dal.ca/policies/>) and the Faculty of Computer Science Responsible Computing Policy. (https://www.cs.dal.ca/downloads/fcs_policy_local.pdf)

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 (<https://theory.stanford.edu/~aiken/moss/>), 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. https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf

Culture of Respect

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 ¹:

1. **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?”
2. **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.”
3. **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.”
4. **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.
5. **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.
6. **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.

University Statements

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

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=69&>

¹Source: 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: <http://www.dal.ca/dept/dalrespect.html> 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.

Territorial Acknowledgement

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

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."

<https://www.dal.ca/about-dal/internationalization.html>

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. 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.

(read more: http://www.dal.ca/dept/university_secretariat/academic-integrity.html)

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:

https://www.dal.ca/campus_life/academic-support/accessibility.html

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 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).

(read more: <http://www.dal.ca/cultureofrespect.html>)

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 don't 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 can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

(read more: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. (read more:

https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy.html)

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 alterna-

tive 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. (read more: https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-original.html)

Student Use of Course Materials

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

Learning and Support Resources

Please see https://www.dal.ca/campus_life/academic-support.html