DALHOUSIE UNIVERSITY
Faculty of Computer Science

CSCI2691 – Introductory Project
CSCI3691 – Intermediate Project
CSCI4691 – Advanced Project
Syllabus

Instructor Information

Instructor:	Robert Hawkey	**Office:**	Microsoft Teams
E-mail:	rhawkey@dal.ca	**Office Hours:**	https://calendly.com/rhawkey
Class Meeting Time:	Tuesday & Thursday 13:05-14:25	**Room No:**	Tuesdays – CHEB140/150 Thursdays – CHEB170
Course Homepage:	https://dal.brightspace.com		

Important Dates

- Last day to add/drop: January 22, 2024
- Munro day (University closed): February 2, 2024
- Last day to drop without a "W": February 6, 2024
- Nova Scotia Heritage Day (University closed): February 19, 2024
- Winter Study Break (No classes held): February 19 – 23, 2024
- Last day to drop with a "W": March 6, 2024
- Good Friday (University closed): March 29, 2024
- No class April 9, 2024 (it is treated as a Friday for course scheduling)

Course Description

Students take on roles in project teams to solve a real-world information technology problem. Team members are drawn from all years of study. The project gives students an opportunity to develop their technical, management, and professional skills.

CSCI2691 students take on junior roles, learning the fundamentals of professional programming in a team environment.

CSCI3691 students take on senior roles and are the primary drivers of tangible progress on their teams, writing most of the code. They also learn to lead through mentorship of junior students.

CSCI4691 students lead their teams. They manage their teams through the software development lifecycle. They act as the primary contact for clients and author the project plan and backlog.

Learning Outcomes

CSCI2691

- Learn and understand the common tools most used in modern software development environments (backlog management software, source code tracking, IDE, stack requirements, communications tools).

- Use these tools in a simulated industrial organization to help solve real world project problems.
- Assist in the completion of user stories under the mentorship of senior students.
- Learn while doing the core skills required of all professional programmers throughout the software development lifecycle:
    - Programming workflow (code, compile, test, commit)
    - Branching strategies in source control
    - Writing clean code
    - Debugging
    - Testing
    - Interacting with team members (clients, managers, peers, QA) professionally
    - Task estimation
- Participate in SCRUM sprint planning, review, and retrospective meetings.
- Learn to work with other developers on a team, including the assessment of peers to give feedback for improvement.

CSCI3691

- Solve real world computer science problems by:
    - Analyzing requirements and constraints
    - Researching technical solutions
    - Applying technical solutions
- Learn to lead through mentoring junior students during the process of implementing portions of user stories.
    - Monitor junior's work to provide unbiased assessment of their technical competencies and feedback for improvement.
- Drive the concrete efforts to produce a solution to a real-world technical challenge.
- Select and implement a modern software development environment:
    - Source code repository, including implementation of branching strategy
    - IDE project shell
    - Stack requirements (databases, web servers, plugins, etc.)
    - Continuous integration and continuous deployment
- Learn and understand the importance of professionalism in software development, mentor juniors to develop professional practices.
- Learn to identify code smells, apply this learning through conducting code reviews via pull requests.
- Play a key role in SCRUM sprint planning, review, and retrospective meetings.

CSCI4691

- Learn while doing the management and direction of the software development lifecycle for a real-world computer science problem.
- Lead, mentor and inspire a team of software developers.
- Identify risks, gather, and refine requirements.
- Author and manage contracts (IP rights, NDAs, etc.).
- Setup and manage the product backlog.
- Identify and resolve impediments to project agility.
- Ensure software quality through team oversight and leadership.
- Validate and authorize key architectural decisions.
- Lead and enforce rules of SCRUM sprint planning, review, and retrospective meetings.
- Act as the primary point of contact with the client.
- Represent the client in SCRUM standups, advocating on their behalf.
- Perform acceptance testing on behalf of the client.
- Author and maintain product proposals, final reports, and documentation.

- Deliver the final product to the client.
- Assess and monitor all team members to provide constructive peer review feedback for improvement.

Course Rationale

The Bachelor of Applied Computer Science program promises that students will learn to "analyze problems, manage and lead teams to tackle those problems, and communicate solutions and opportunities back to the wider organization."[1] Through a "learn while doing" approach these courses are an implementation of that promise.

Course Philosophy

It's my understanding that this course should be a simulation of the practice of software development used by the average ***modern*** industry organization. Therefore, we will create an imaginary corporation "Project Corp." with the instructor as the CEO, and TAs as other C-level executives. Project Corp. is a software development company that develops free software for charities and educational institutions, a terrible business strategy!

C-levels barely do any work! They just stick their noses into the business of the teams they lord over and, if they are any good, inspire and educate. I suppose they also supervise teams and make sure the teams are running properly, and in doing so cast judgement. Our job is to keep our finger on the pulse of the organization, to provide feedback, to praise and encourage practices that increase the success of our organization, and correct practices that impair our organization's success.

Students will be Project Corp. employees. Your academic year will determine the role you fill on your team. See the role descriptions below.

Continuous learning and experimentation are DevOps principles practiced by highly agile organizations. We will adopt this practice. Each week you will have something to learn, this learning will be timely to the actions you need to take to play your role in advancing your team's project. Learning and applying these topics will allow you to meet the learning outcomes of the course. We will use the "flipped classroom" technique, each week you will spend 1 hour studying a topic on your own time. Modules on Brightspace will guide you.

Project Corp. is a job, however, since you're a student you have other jobs too (courses if you're fulltime, or a combination of courses and work if you are part time). A full course load for a student is 5 courses, and therefore Project Corp. demands a fifth of your week's efforts. 1 hour will be spent learning the week's flipped classroom topic. 3 hours will be spent in class working as a team to conduct sprint meetings and developing software while co-located for ease of communication and discussion. 3 hours will be spent by you working individually focusing on your sprint tasks for the week. **This adds up to an expected workload of 7 hours per week for this course. Just like a real job sometimes you'll need a few extra hours (for example around major deliverables). Think of this like homework for assignments in other courses.** In our observations of your work, you will need to demonstrate that you have invested this time each week.

Because we are simulating industry much of your assessment will be performed as it is commonly done in industry. A very popular assessment strategy is called 360 reviews, a form of peer assessment that attempts to gauge whether you're doing a good job, as observed by how your work is affecting the team members and project timeline. Your grade will be based on these reviews, the observation of your C-levels and other measures of your performance. Being a good employee earns a good grade, being a bad employee earns a bad grade (or worse being FIRED, i.e. an F). The C-levels will provide

[1] https://www.dal.ca/academics/programs/undergraduate/applied-computer-science.html

feedback to you so that you know, and are in control of, where you currently stand. They will tell you what you need to continue doing, what you need to stop doing and what you need to start doing.

Junior Developers (CSCI2691)

Unlike junior programmers in real industry, you are still early in your education, and therefore your ability to contribute to the project may be less than higher year students. However, at Project Corp. we strongly believe in the benefit of continuous experimentation and learning, so your job is just that! You will spend much of your time learning and practicing the work of software development. You will contribute where you can under the guidance of senior developers, assisting them in the completion of their stories. In doing so you will help them learn how to mentor and lead.

Senior Developers (CSCI3691)

More is expected of you at this stage. You will be the primary driver of tangible progress on your team. This description is vague because our projects are varied. You may be researching a technical solution for others to implement. You may be deciding on a stack and implementing and using that stack to create software for a client, doing most of the configuration and programming. You are not alone in this effort: you must collaborate with your peers and come to agreement, mentor junior developers who will assist you, and lean on your development director or technical director when you are stuck.

Development Director (and Technical Director) (CSCI4691)

You learned to lead when you were a senior developer, now it's time to do it. You will direct and oversee the development of your project. This includes being the primary point of contact with your client, responsibility for the story board, supervising developers, being the final word on architectural choices, acting as the client's representative in SCRUM meetings, assembling and authoring documentation, and finally being the one to put out fires. Unlike industry you're not on your own! You are applying these skills you've gathered for the first time and the C-levels will interact with you regularly to assist you with hard choices.

Class Format and Course Communication

- This course uses a flipped classroom. Students are expected to spend 1 hour outside of the class **before the first lecture each week** reviewing learning modules on Brightspace. These learning modules feature a global topic applicable to all students, and specific learning modules unique to each course that act as just in time training for your current activities in class.
- Students are expected to do 3 hours of project work per week individually outside of class. This work must be done **before the last lecture in each week**.
- Students attend each lecture and work with their team. This co-located time is when group meetings, planning, design, and collaboration occur. **Attendance is mandatory and lecture time is for group project work only.**
- Major course announcements will be posted to Brightspace which should trigger a notification to your Dal email address. It is the student's responsibility to check their Dal email daily. To access your Dal email, see: https://www.dal.ca/dept/its/o365/services/email.html
- Students will be added to a Microsoft Teams channel. The General channel will be used for general/minor course announcements and discussion. Each team will have a private Teams channel for group communication. The use of Microsoft Teams is mandatory, other communication platforms such as discord, whatsapp, slack, etc. are not allowed.

Evaluation Criteria

In this course you play the role of an employee of a software development organization. If you are a good employee, you are praised and rewarded (with higher grades in our case) and if you are a bad employee, you are corrected, warned or possibly fired (i.e. lower grades in our case, all the way to an

F). Industry does not put up with bad employees, however in our scenario you are ***learning*** to be good programmer employees. This means you may need guidance and opportunity to fail and recover.

It is your responsibility to understand the project timeline, how your project will progress through the software development lifecycle, and your role in these efforts. This document provides a timeline that shows what your team will be doing each week and lecture. It also includes a list of topics you will study as part of the flipped portion of this course. Each week, learn what you need to learn, and then do your best to apply these skills to fulfill your employee role and help to progress your team's project.

You have one primary grade: **Employee Status**. **It is worth 100% of your final grade.** It will start at a B. At important milestones in the course the grade will be adjusted up or down or left as is. We will use various mechanisms to decide your "Employee Status":

- 360 Reviews:
    - 360 Reviews are a very common industry practice for gathering peer feedback. In the ideal (not polluted by office politics/corporate greed) these reviews provide employees with perspective on how their work affects the work of others and the success of the project as a whole.
    - You will write 360 reviews of all other team members after each major sprint.
- Instructor and TA observations:
    - The instructor and TAs will be attending group meetings every lecture. They will be in your standups, sprint planning, sprint review and sprint retrospective meetings.
    - **We will work as a team to achieve a good level of understanding of the state of teams and of the individual contributions of each team member.**
    - We will observe and oversee your commits to source control.
    - We will ensure integrity of the 360 review process, ensuring you are giving accurate and honest feedback of your peers.
- Client feedback:
    - At a midway point and at the end of the project clients will be asked to give their feedback on interactions with team members and on the overall success of their project.
    - Client feedback is incorporated into the overall picture which may result in raising or lowering employee status.

We will communicate our feedback and your current employee status with Project Corp to you through email. We will provide feedback from the previous iteration collected from 360 reviews. We will anonymize this feedback by summarizing the issues and compiling our own observations to give you an assessment of where you stand. We will provide a set of behaviours and practices to start doing, stop doing or to continue doing. You will be able to respond to and discuss these issues privately via this email chain. These discussions are only seen by the course instructor.

At the end of the semester your final employee status is the grade that will be submitted to the registrar.

It is critical to understand the following about your grade:

- Earning an A requires **continuous** demonstration of ***excellence*** throughout the semester.
- Earning a B requires **continuous** demonstration of ***good*** work throughout the semester.
- Continuously meeting the minimum expectations of your role in this course earns a **C** grade.
- Refer to the grade scale and definitions link below to understand what differentiates the letter grades.

Full Grade Decrement Policy

Our evaluation process is not without flaws. You are observed from the outside, we are looking at your group and individual successes and failures. We cannot see everything. Our experience shows that the method breaks down in the event of:

- Severe incompetence that is discovered too late for us to provide feedback or opportunity for correction.
- Dishonesty

To protect the integrity of the course, we may invoke the Full Grade Decrement Policy. In this case your grade will be lowered by a full grade (e.g., B+ becomes a C+). We will invoke this clause when major problems are discovered at the very end of the course when opportunity for feedback and correction is no longer possible.

It is what you accomplish in this course that matters most. We take your word for it in the moment, but at the end of the course the bill comes due. We inspect all work to verify that the actuals align with what you have reported throughout the semester.

Notes

- A minimum grade of C 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 scale and definitions listed on Dalhousie's website will be used: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html

Student Declaration of Absence

Student declaration of absences are not authorized in this course. Instead, you have **2** "sick days". This simplifies the administration of illnesses and avoids the necessity of a form being filled out. Attendance is tracked in every lecture. Students may miss 2 lectures in the semester without affecting your grade. This is an experiential learning course, therefore further absences will affect your ability to contribute equally to your team, and therefore affect your employee status. In industry you must provide notice to your company when you are ill. **Our requirement is that you must inform your team by posting to your team's private Microsoft Team's channel by 9AM on the morning of your absence to let them know you will not be present.** No explanation is necessary, you may do this up to 2 times in the semester. If your illness falls on a sprint review, retrospective and planning class ideally you should connect remotely and at least listen to your teammates work through the sprint resolution process. This is not always possible of course, and in these cases, it is your duty as a good employee to find out what you missed when you are back and to put in some extra effort so that your team does not fall behind.

Absences that are likely to recur, or that extend beyond two missed classes, are outside of our ability to accommodate in this team-based development course. These situations must be handled by the Faculty's Assistant Dean of Undergraduate Students. Contact the dean by email at: fcsadus@dal.ca

Academic Standards

Project Corp. holds itself to the strictest ethical standards. Failure to properly attribute sources in your work will be treated as an academic standards issue and not following citation requirements will affect your employee status. 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.

Generative AI (ChatGPT, etc.) is not authorized in this course. It's cool, but you're here to learn. It already learned.

Required Texts and Resources

- None.
- All educational material will be provided through Brightspace learning modules and links to external resources.

Prerequisites

CSCI2691
(CSCI 1170.03 or CSCI 1206.03 or INFX 1606.03) and (CSCI 1100.03 or CSCI 1101.03 or CSCI 1105.03 or CSCI 1110.03)
CSCI3691
CSCI 2134.03, 2141.03, CSCI 2170.03, CSCI 2690.03, CSCI 2691.03
CSCI4691
CSCI 3130.03, CSCI 3691.03, MGMT 2303.03

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. For more information please see https://www.dal.ca/content/dam/dalhousie/pdf/faculty/computerscience/policies-procedures/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 (https://theory.stanford.edu/~aiken/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. https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf

Student Health and Wellness

Taking care of your health is important. As a Dalhousie student, you have access to a wide range of resources to support your health and wellbeing. Students looking to access physical or mental health & wellness services at Dalhousie can go to the Student Health & Wellness Centre in the LeMarchant Building. The team includes: registered nurses, doctors, counsellors and a social worker. Visit **dal.ca/studenthealth** to learn more and book an appointment today.

Students also have access to a variety of online mental health resources, including telephone/texting counselling and workshops/training programs. Learn more and access these resources at d**al.ca/mentalhealth**.

Culture of Respect[2]

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. **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. A**ppeal 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=111&loaduseredits=False

Territorial Acknowledgement

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

Dalhousie acknowledges the histories, contributions, and legacies of the African Nova Scotia people and communities who have been here for over 400 years.

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

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[2] 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: 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.

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 jus- tice 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-con.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 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. (read more: https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assigments-and-use-of-originality.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